

# STRUCTURE OF MICROCARD

A01/1 = Structure of microcard

A03/1 = Special features, general instructions, safety measures, testers and tools, test specifications, tightening torques

B01/1 = Repair

N25/1 = Index

N27/1 = Table of contents

N28/1 = Editorial note

Continue: A02/1 Fig.: A01/2

	1		2			
	12345	67890	12345	67890	12345	678
	SIS					
A	XXXXX	XXXXX	XXXXX	XX		
B	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX
C	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX
D	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XXX
E	XXXXX	XXXXX	XXXXX	XXXXX	XXXXX	XX
F						
G						
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J						
K						
L						
M						
N						X XXX

Continue: A02/1

## STRUCTURE OF MICROCARD

The user prompting appears on every page, e.g.:

- Continue: B17/1
- Continue: B18/1    Fig.: B17/2

.../1 = Upper coordinate half

.../2 = Lower coordinate half

Continue: A03/1

## SPECIAL FEATURES

These instructions describe the repairing of:

- \* In-line pumps of type PE(S)..P..S 8500, with no governor, LDA, timing device and supply pump

Disassembly and assembly of the various types of governor are effected in line with the respective repair instructions.

Continue: A04/1

## GENERAL

### Miscellaneous:

These repair instructions outline all the repair procedures involved with size "P" in-line pumps of type "S 8500".

The various designs of in-line pump are to be taken from the associated service-parts lists.

Scrap worn and damaged parts.

Continue: A04/2

## GENERAL INSTRUCTIONS

### Misceleaneous:

Always renew sealing elements.

If injection-pump components are to be stored for a lengthy period, they should be covered and protected against rusting.

Wash out plunger-and-barrel assemblies and delivery-valve assemblies in cleaning agent: Moisten plungers with calibrating oil.

Rub over sealing rings with tallow.

Continue: A05/1

## SAFETY MEASURES

Cleaning of components:

Wash out components in cleaning agent such as chlorothene NU, which is both commercially available and not readily flammable.

Pay attention to the following safety regulations !!!

In Germany:  
Order Governing Work with Combustible Liquids (Vbf) as published by Federal Labor Ministry (BmA).

Continue: A05/2

## SAFETY MEASURES

Safety regulations for handling chlorinated hydrocarbons

Companies ZH 1 / 222

Employees ZH 1 / 119

as published by the Hauptverband für Gewerbliche Berufsgenossenschaften (Zentralverband für Unfallschutz und Arbeitsmedizin), Langwartweg 103, 5300 Bonn 5, Germany.

As regards other countries, attention is to be paid to the appropriate local legislation.

Continue: A06/1

## SAFETY MEASURES

EXCLUSIVE use is to be made of the special tools listed in these repair instructions.

INJURIES CANNOT BE RULED OUT if these tools are not used !

Continue: A06/2

## SAFETY MEASURES

The procedure outlined in the Sections "REMOVING ROLLER TAPPET" and "FITTING ROLLER TAPPET" must be performed with extreme care. If not, there is a danger of sudden plunger-return-spring tension relief and INJURY CANNOT BE PRECLUDED!

Continue: A07/1

TESTERS, DEVICES AND TOOLS

- \* Puller 0 986 611 667  
KDEP 1056
- \* Support sleeve 0 986 611 676  
KDEP 1056/0/8  
Removal of end covers from tappet  
holding-up holes
- \* Insertion device 0 986 611 738  
KDEP1071  
Fitting of control sleeves

Continue: A07/2

TESTERS, DEVICES AND TOOLS

- \* Assembly tool 0 986 612 072  
KDEP 1556
- \* Tubular lever from 0 986 611 993  
KDEP 1505  
Pressing down roller tappets
- \* Assembly sleeve 0 986 612 059  
KDEP 1548
- \* Assembly sleeve 0 986 612 060  
KDEP 1549  
Protection of drive-end cylindrical-  
roller bearing on installing  
camshaft

Continue: A08/1

## TESTERS, DEVICES AND TOOLS

- \* Spacers 0 986 612 061  
KDEP 1550  
For placing beneath barrel-and-  
valve assemblies
- \* Pressing-in tool 0 986 612 494  
Pressing cylindrical-roller bearing  
into bearing end plate
- \* Pressing-in tool 0986 612 065  
KDEP 1552  
Guide sleeve 0 986 612 493  
Pressing in roller-bearing outer race
- \* Tappet holder 0 986 612 482  
Holding up tappet

Continue: A08/2

## TESTERS, DEVICES AND TOOLS

- \* Holding wrench 0 986 612 071  
KDEP 1555  
Counterholding and turning  
camshaft
- \* Pressing-on tool 0 986 612 084  
KDEP 1558
- \* Pressing-on tool 0 986 612 085  
KDEP 1559  
Installation of radial-lip-type  
oil seal in bearing end plate
- \* Support ring 0 986 612 106  
KDEP 1568

Continue: A09/1



TESTERS, DEVICES AND TOOLS

- \* Tool 0 986 612 107  
KDEP 1569  
For pressing roller bearings in and out
- \* Extractor 0 986 612 111  
KDEP 1570  
For pulling bearing ring out of bearing end plate
- \* Retaining pin 0 986 612 114  
KDEP 1571  
Holding up plunger for leak test

Continue: A09/2

TESTERS, DEVICES AND TOOLS

- \* Pressing-in mandrel 0 986 612 119  
KDEP 1574  
Knocking base end covers out and in
- \* Pliers 0 986 612 120  
KDEP 1575  
For removing and inserting pump plungers
- \* Pin-type socket wrench 0 986 612 129  
KDEP 1577  
Screwing threaded bushings at control rod out and in

Continue: A10/1

TESTERS, DEVICES AND TOOLS

- \* Pressure plate                    0 986 612 134  
   KDEP 1580  
Pressing in roller bearing (inner  
race)
- \* Pressing-in mandrel            0 986 612 156  
   KDEP 1598  
Pressing end covers into tappet  
holding-up holes
- \* Assembly tool                    0 986 612 325  
   KDEP 1714  
Fitting retainer on barrel-and-  
valve assembly

Continue: A10/2

TESTERS, DEVICES AND TOOLS

- \* Pressing-out sleeve            0 986 612 354  
   KDEP 1735  
Pressing out camshaft (inner race  
of roller bearing)
- \* Pressing-out disk + tube    0 986 612 355  
   KDEP 1736  
Pressing out roller-bearing outer  
race
- \* Holding wrench                    0 986 611 084  
   KDEP 2885  
Counterholding and turning cam-  
shaft

Continue: A11/1

TESTERS, DEVICES AND TOOLS

- \* Puller 0 986 612 397  
KDEP 1763  
Removing barrel-and-valve assemblies
- \* Extractor mandrel 0 986 611 292  
KDEP 2938  
Removal of plunger return springs
- \* Tappet forceps 0 986 611 298  
KDEP 2938  
Removal and installation of  
tappets

Continue: A11/2

TESTERS, DEVICES AND TOOLS

- \* Assembly tool for timing device 0 986 611 309  
KDEP 2944
  - Socket wrench 0 986 611 310  
KDEP 2944/0/1
  - Pin-type socket wrench 0 986 611 311  
KDEP 2944/1
  - Extractor mandrel 0 986 611 314  
KDEP 2944/2
- Removal and attachment of timing devices with 20 mm taper.
- \* Installation tool 0 986 611 356  
KDEP 2962
- Accommodation of barrel-and-valve assembly

Continue: A12/1

TESTERS, DEVICES AND TOOLS

- \* Support clamp                    0 986 611 358  
                                     KDEP 2963  
Pumps with flange mount
- \* Clamping device                0 986 611 441  
                                     KDEP 2985  
For base attachment
- \* Socket wrench                   0 986 611 451  
                                     KDEP 2986  
Loosening of delivery-valve holders
- \* Box wrench                      0 986 611 452  
                                     KDEP 2997  
Turning of barrel-and-valve  
assemblies

Continue: A12/2

TESTERS, DEVICES AND TOOLS

- \* Directional-cont. valve 0 986 615 111  
                                     KDEP-P 100/1.1  
Pressure reduction during leak  
test
- \* Drive coupling                   1 686 430 038
- \* Socket wrench                   0 986 612 489  
Turning of tappet retainers
- \* Centering mandrel              0 986 612 492  
Assembly of roller tappets

Continue: A13/1

## TESTERS, DEVICES AND TOOLS

- \* Assembly tool 0 986 612 495  
Installation of O-ring/support  
rings on barrel-and-valve  
assembly
- \* Puller 0 986 612 498  
Disassembly of impact caps
- \* Spring tensioner 0 986 612 311  
Tensioning control-rod return  
spring
- \* Extractor 0 986 612 505  
Disassembly of bearing end plate

Continue: A14/1

## TEST SPECIFICATIONS

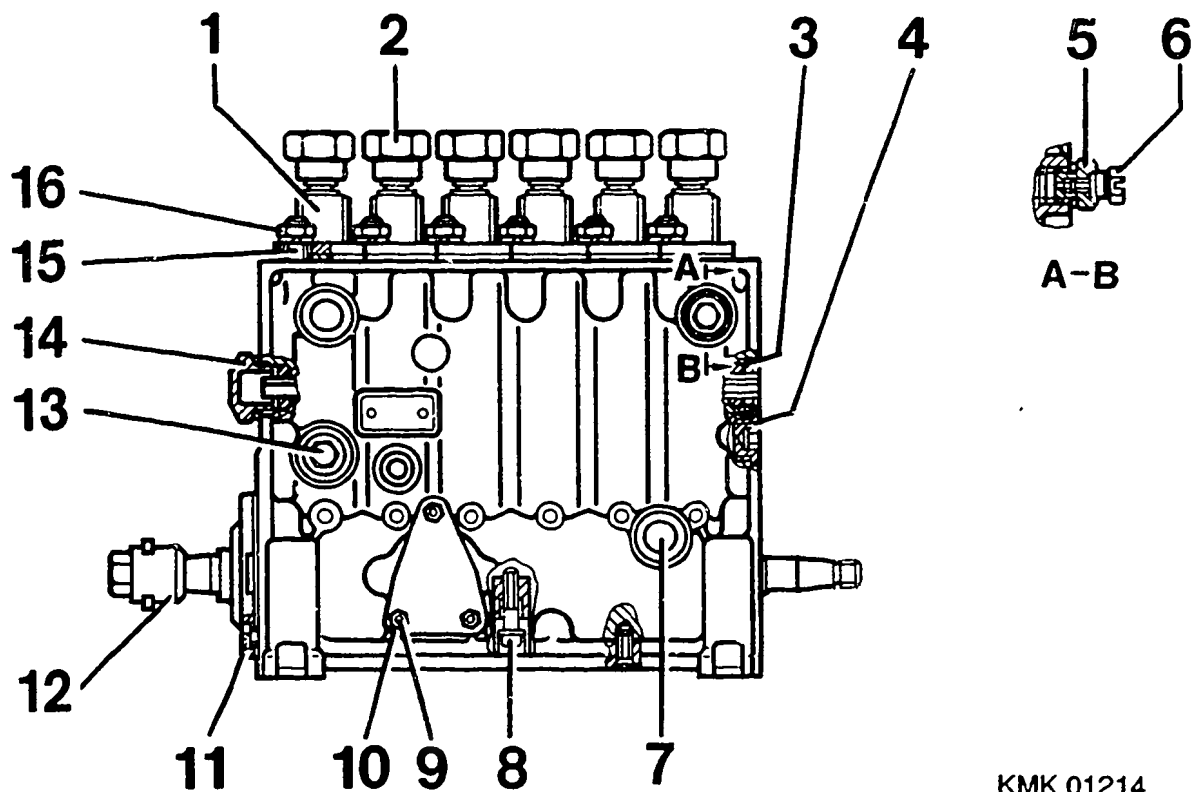
- \* Leak test - suction gallery  
8 minutes at 5 bar, then 1 minute  
pulsating 0 ... 5 bar.
  
- \* Leak test - camshaft, spring and  
governor chamber  
7 minutes at 1.5 bar, then  
1 minute at 0.5 bar.

Continue: A15/1

# TIGHTENING TORQUES

1 = Delivery-valve holder	110...120 Nm
2 = Cap nut	max. 25 Nm
3 = Control-rod guide bushing	30... 40 Nm
4 = Screw plug	40... 50 Nm
5 = Threaded bushing	20... 30 Nm
6 = Bleeder screw	4... 5 Nm
7 = Reducer bushing	
M 14 x 1.5	20... 25 Nm
M 16 x 1.5	30... 40 Nm
8 = Fillister-head screw for steel intermediate bearing	7... 9 Nm + 90 degrees!
9 = Threaded pin	3.5...4.5 Nm
10= Hexagon nut	7... 9 Nm

Continue: A16/1 Fig.: A15/2

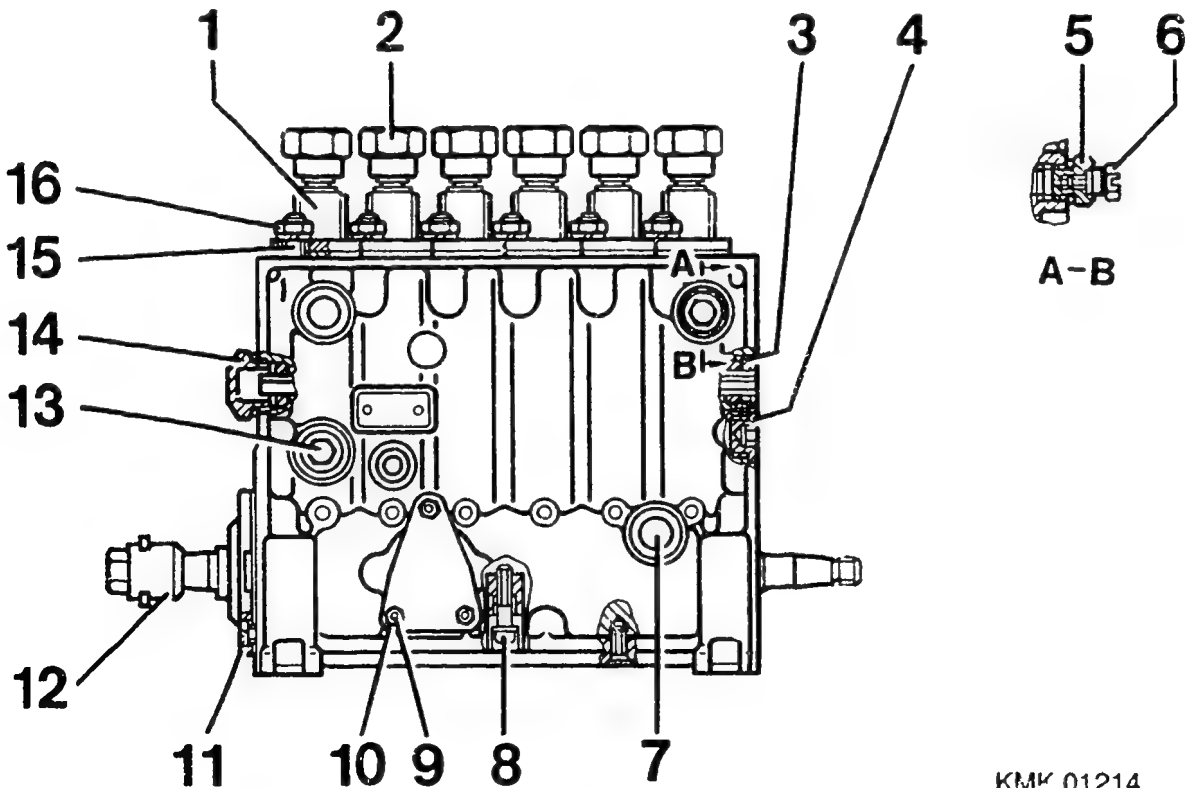


KMK 01214

# TIGHTENING TORQUES

11= Bearing-end-plate attachment			
Fill.-head screw	M 6	7... 9	Nm
Torx bolt	M 6	10... 12	Nm
Torx bolt	M 8	18... 20	Nm
Hexagon-socket-	M 6	10... 12	Nm
head cap screw	M 8	18... 20	Nm
12= Couplings and timing device			
Union nut:			
M 14 x 1.5		85...100	Nm
M 18 x 1.5		100...120	Nm
Hexagon nut:			
M 14 x 1.5		65... 75	Nm
M 18 x 1.5		100...110	Nm
M 20 x 1.5		180...210	Nm
M 24 x 1.5		200...230	Nm

Continue: A17/1 Fig.: A16/2



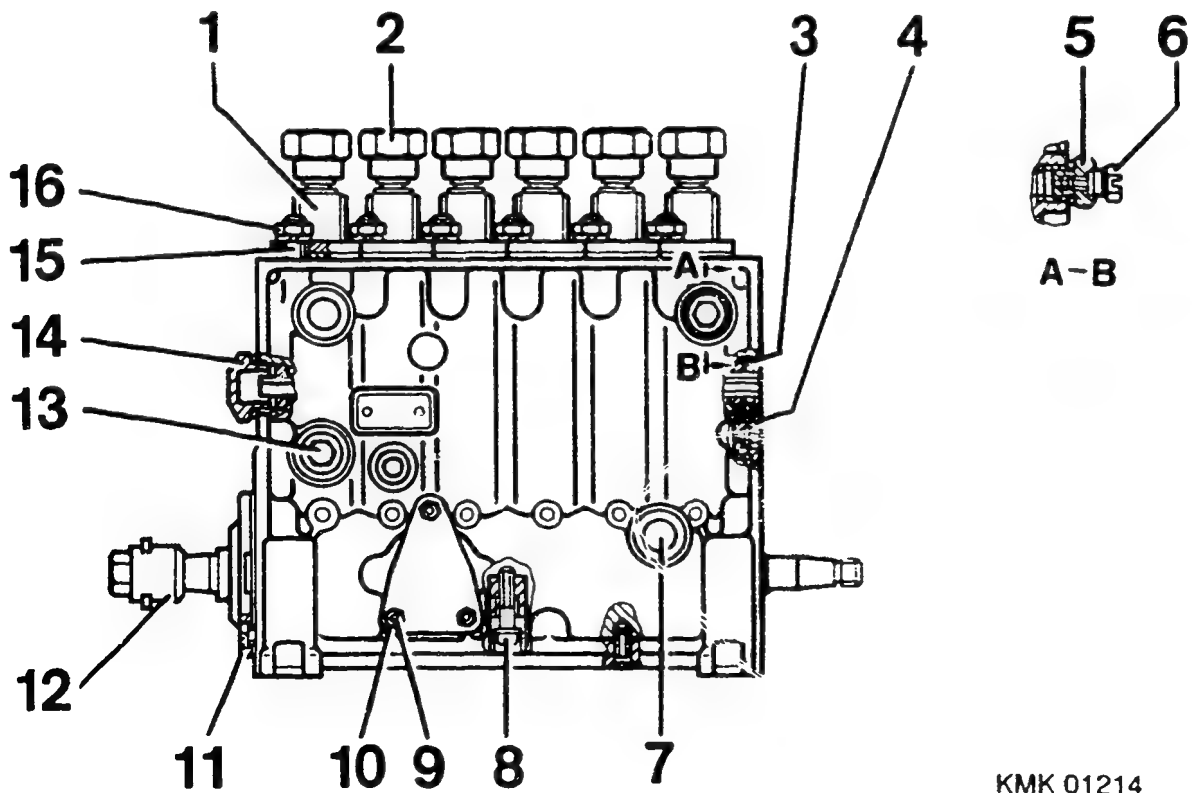
KMK 01214



# TIGHTENING TORQUES

13= Screw plug	40... 60 Nm
14= Closing cap	40... 60 Nm
15= Threaded pin	25... 30 Nm
16= Hexagon nut	50... 55 Nm

Continue: B01/1 Fig.: A17/2



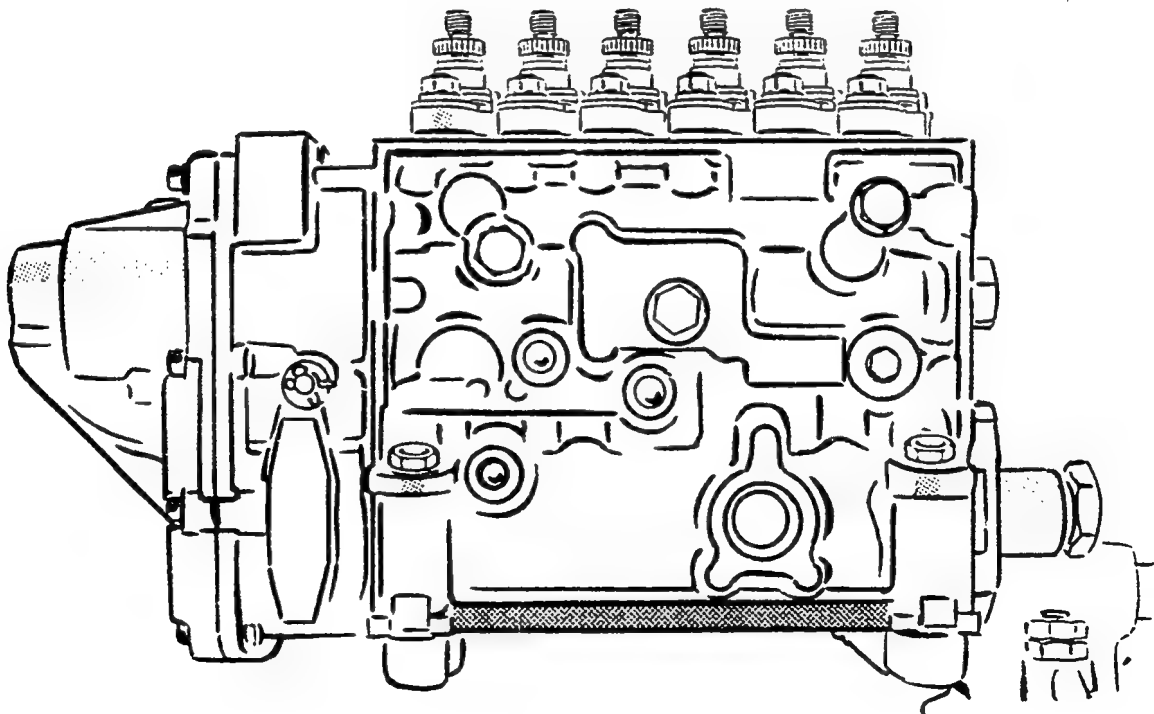
KMK 01214

DISASSEMBLY OF FUEL-INJECTION PUMP  
(WITHOUT GOVERNOR)

Clamp in-line pump PE..P.. with base  
attachment to rotatable clamping frame  
0 986 611 248 (KDEP 2919) in  
conjunction with clamping device  
0 986 611 451 (KDEP 2985) .

Pumps with flange mount require the  
use of the support clamp 0 986 611  
358 (KDEP 2963) with suitable  
attachment flanges.

Continue: B02/1 Fig.: B01/2



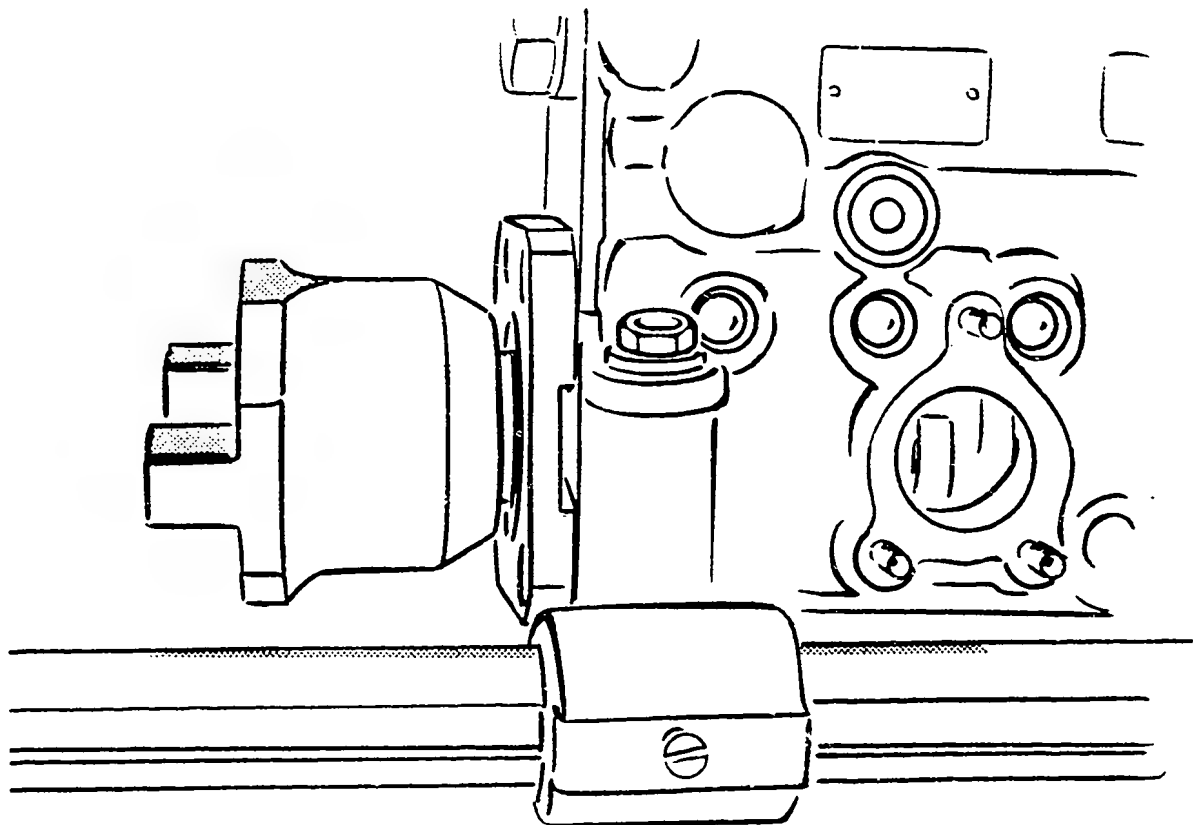
KMK 01215

## INSTALLING DRIVE COUPLING

Remove motor drive coupling.

Install drive coupling 1 686 430 038  
on camshaft.

Continue: B03/1 Fig.: B02/2



KMK 01216

## REMOVAL OF PRESTROKE SHIM

Losen fastening nuts of barrel-and-valve assemblies and continue turning approx. 3 turns.

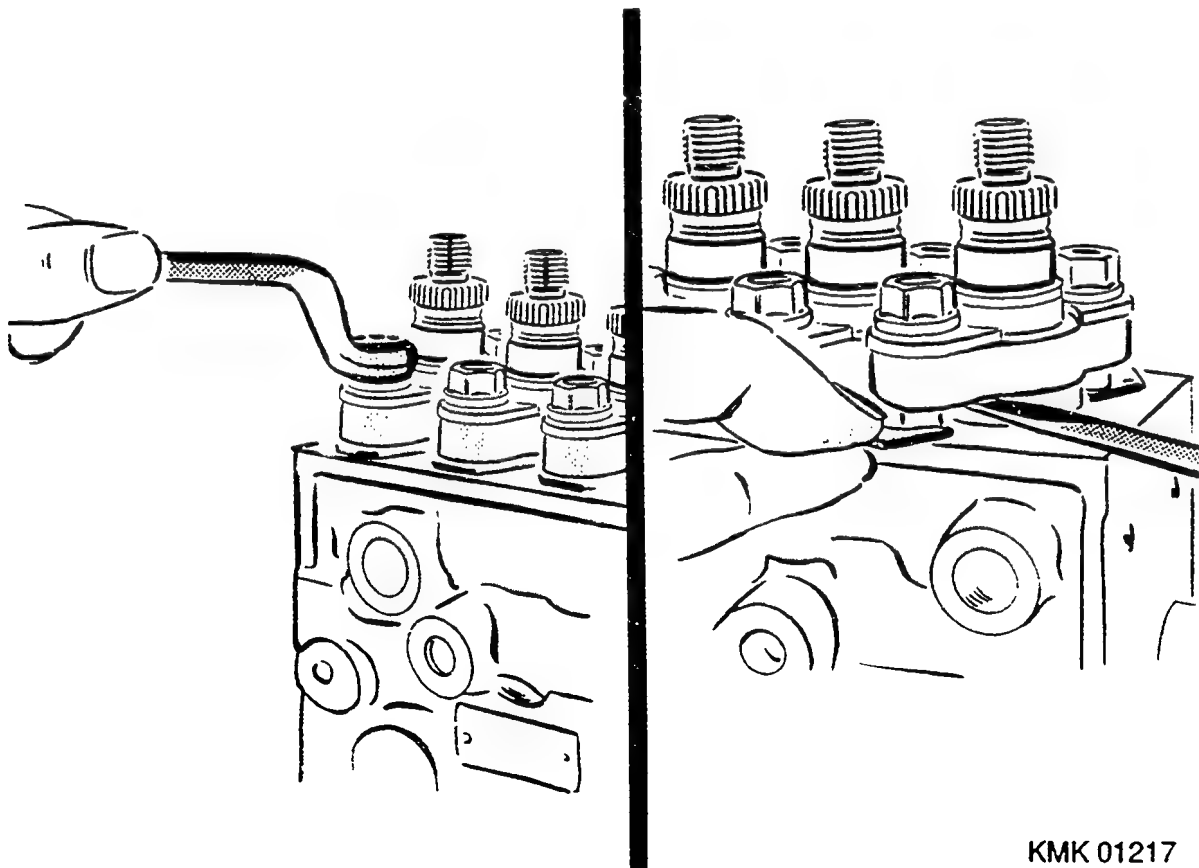
Raise barrel-and-valve assemblies with a screwdriver and remove prestroke shims.

### Note:

The prestroke shims are paired in terms of thickness.

It is therefore advisable to store them accordingly.

Continue: B04/1 Fig.: B03/2



KMK 01217

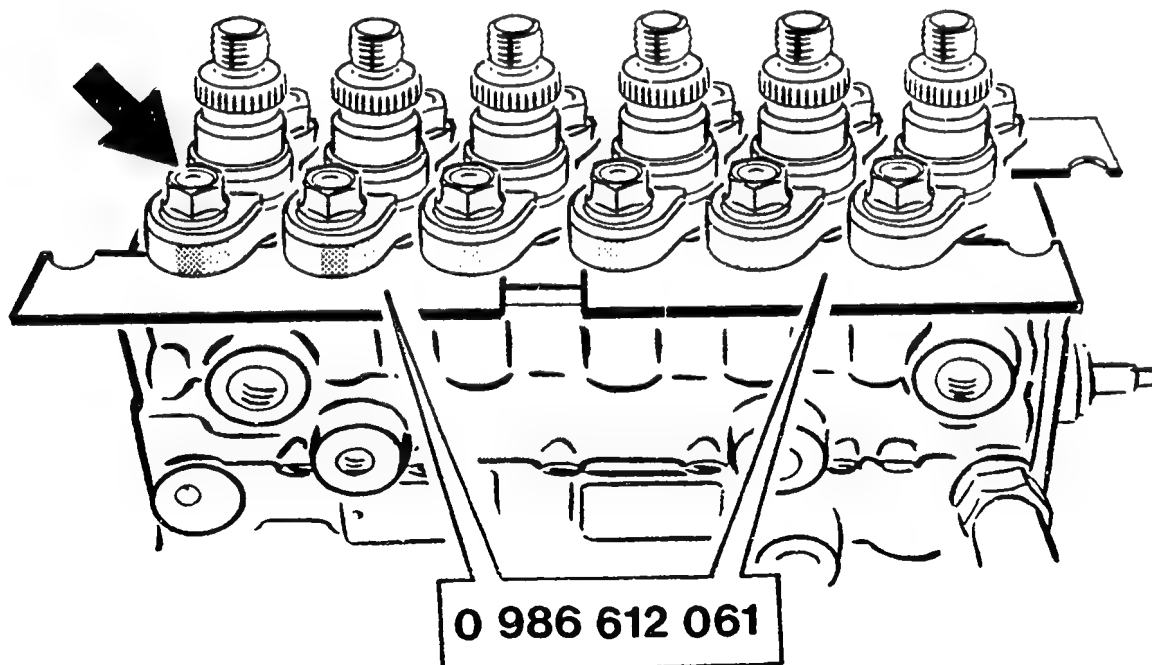
**INSERTING SPACERS 0 986 612 061  
(KDEP 1550)**

Insert spacers 0 986 612 061 (KDEP 1550) in place of prestroke shims beneath plunger-and-barrel assembly flanges.

Tighten fastening nuts (arrow) again by hand as a temporary measure.

Continue: B05/1 Fig.: B04/2

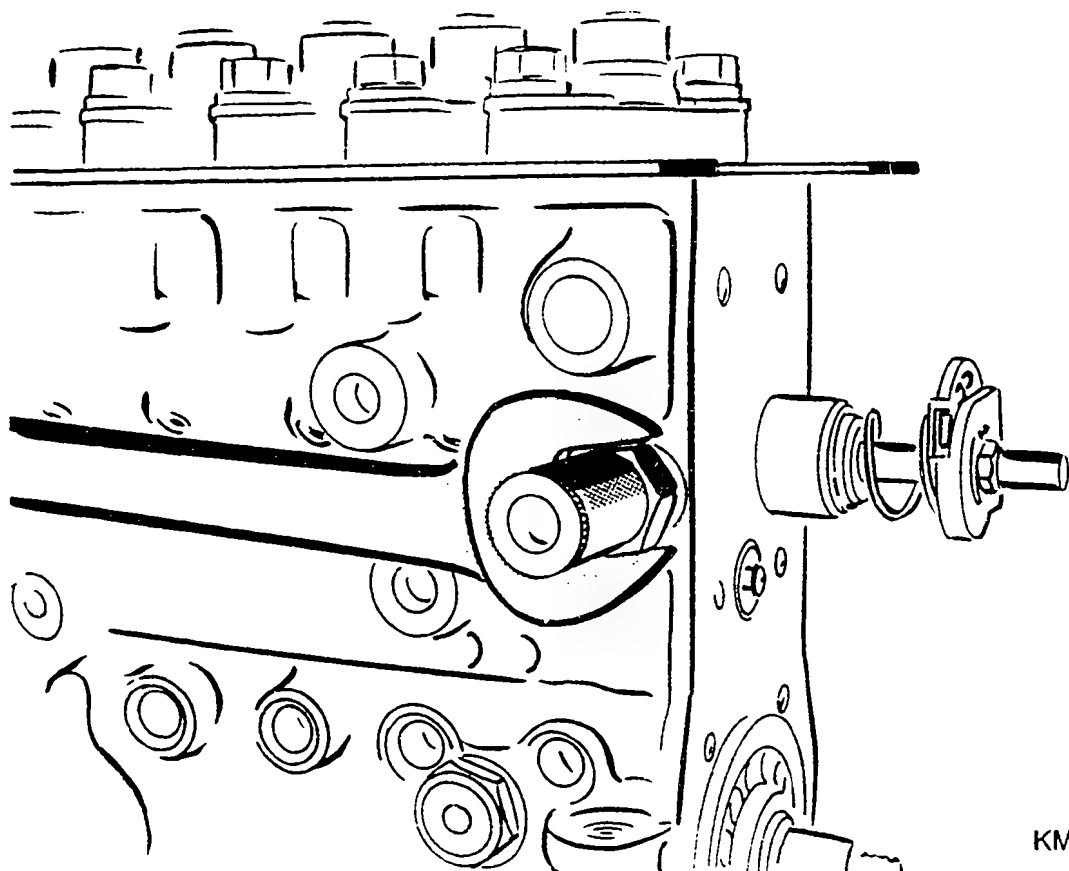
KMK 01218



# REMOVING ADD-ON MODULES

Screw out overflow valve.

Continue: B06/1 Fig.: B05/2

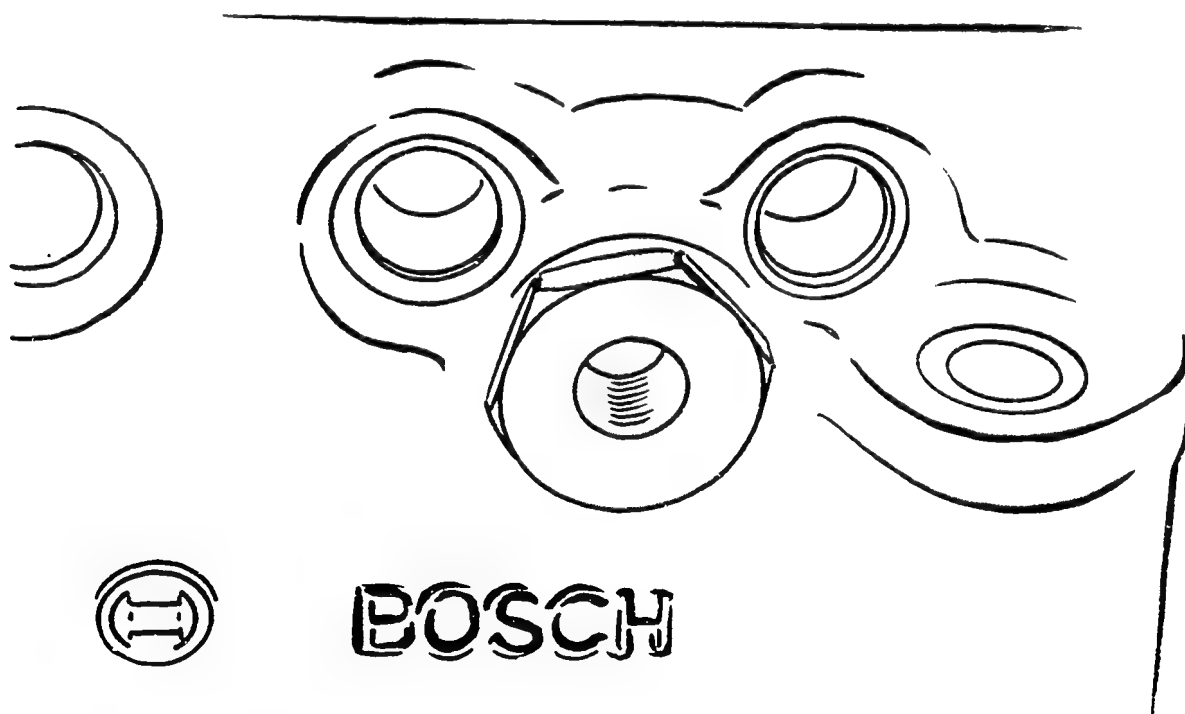


KMK 01219

## REMOVING ADD-ON MODULES

Screw out connecting nipple of oil  
return if fitted.

Continue: B07/1 Fig.: B06/2



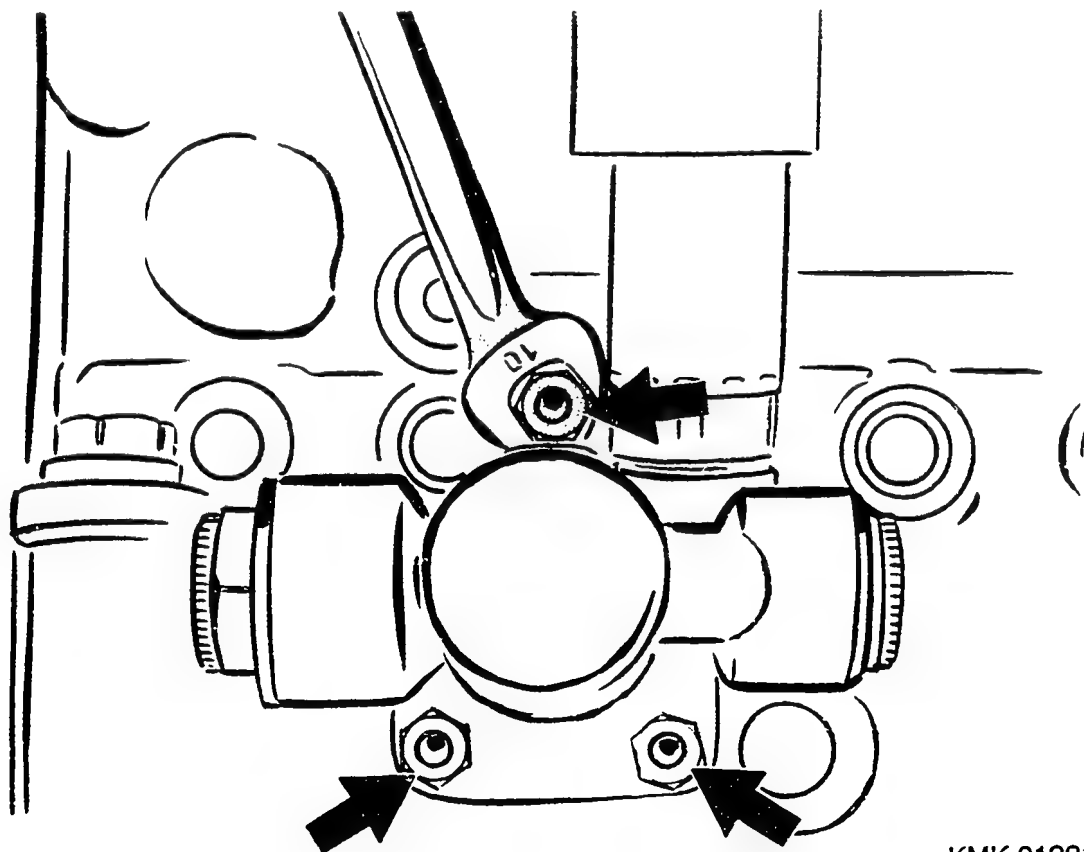
KMK 01220

## REMOVING SUPPLY PUMP

Loosen and unscrew hexagonal nuts  
(arrows).

Remove supply pump and seal.

Continue: B08/1 Fig.: B07/2



KMK 01221



## DISASSEMBLING END COVERS

Attach support sleeve 0 986 611 676  
(KDEP 1056/0/8) to tool 0 986 611 668  
(KDEP 1056).

Turn back wing nut of tool and insert  
puller 0 986 611 668 (KDEP 1056) in  
end cover.

Screw wing nut in as far as possible,  
so as to straddle collet chuck of tool  
in end cover.

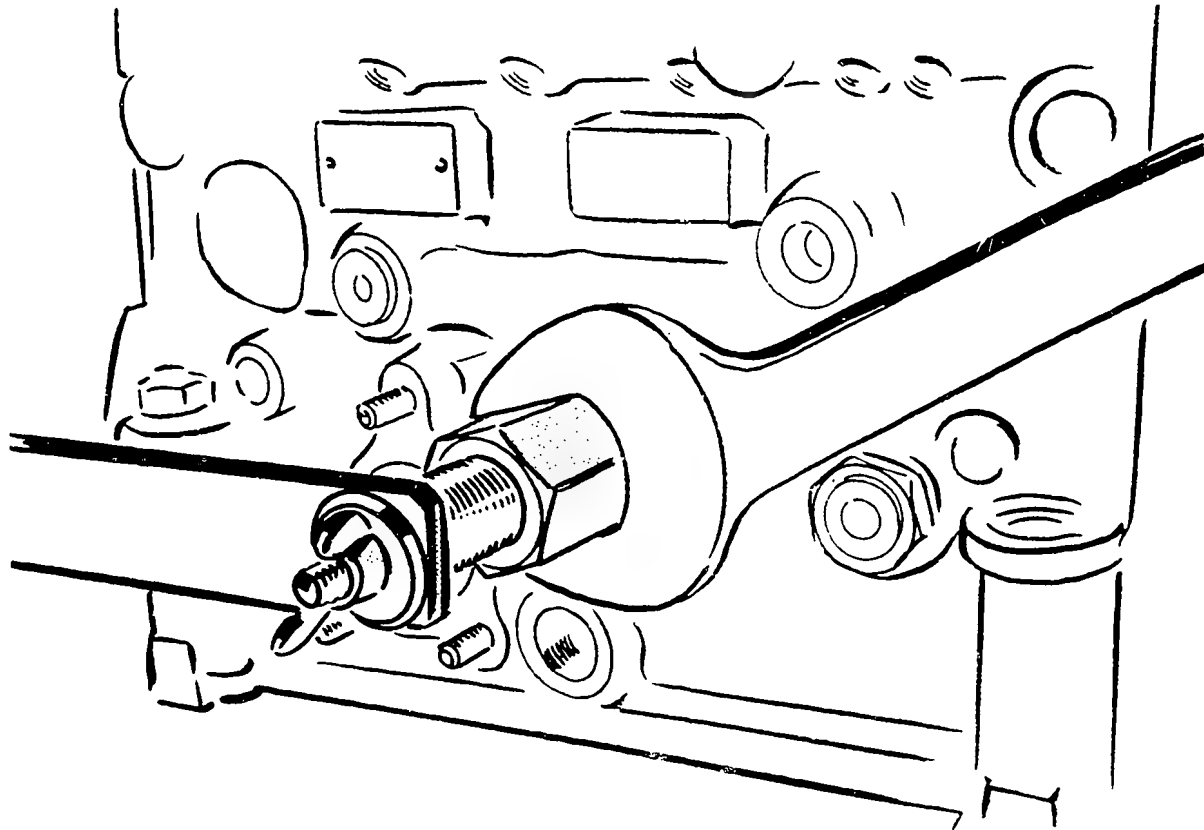
Continue: B09/1

## DISASSEMBLING END COVERS

Hold handle of fixture and turn sleeve of puller with wrench until end cover is pulled out of pump housing.

Remove end cover from fixture and scrap it. Re-use is not permitted.

Continue: B10/1 Fig.: B09/2



KMK 01222

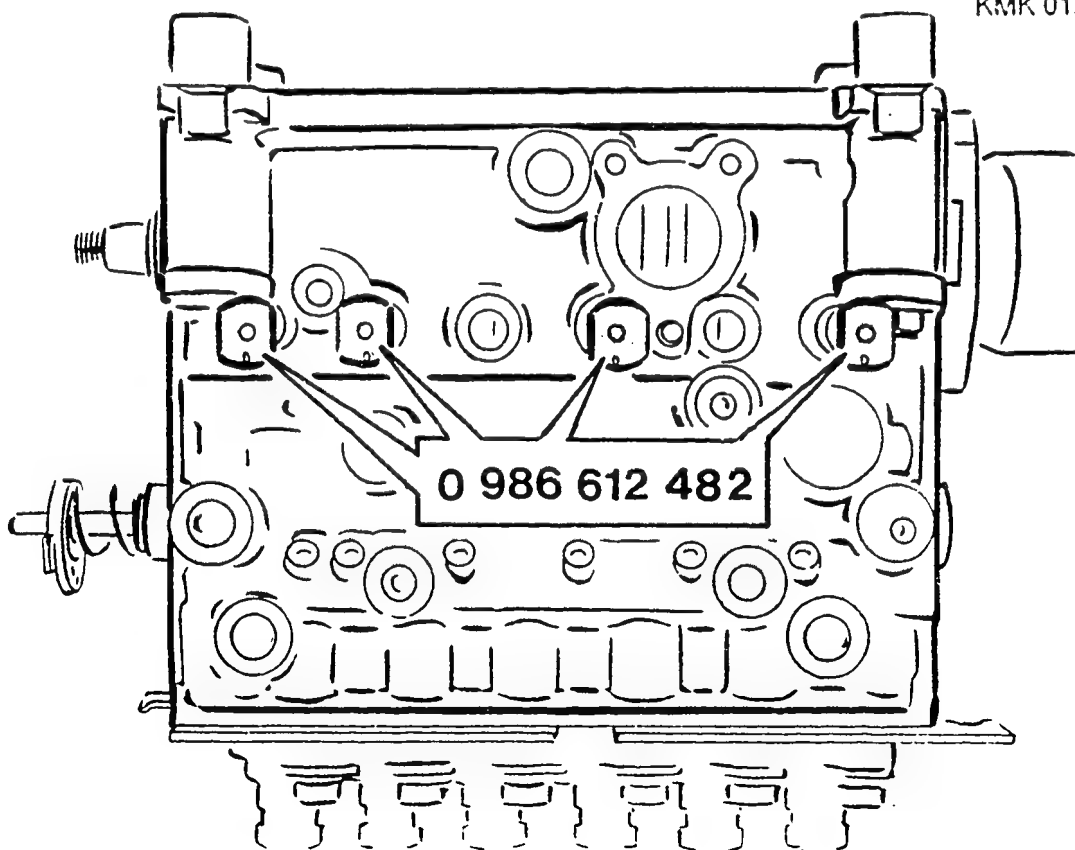
## INSTALLING TAPPET HOLDER

Turn fuel-injection pump round so that delivery-valve holders face downwards.

Attach holding wrench 0 986 611 084 (KDEP 2885) to drive coupling.

Immediately insert tappet holder 0 986 612 482 provided that tappet holding-up hole is not covered by roller tappet.

Continue: B11/1 Fig.: B10/2



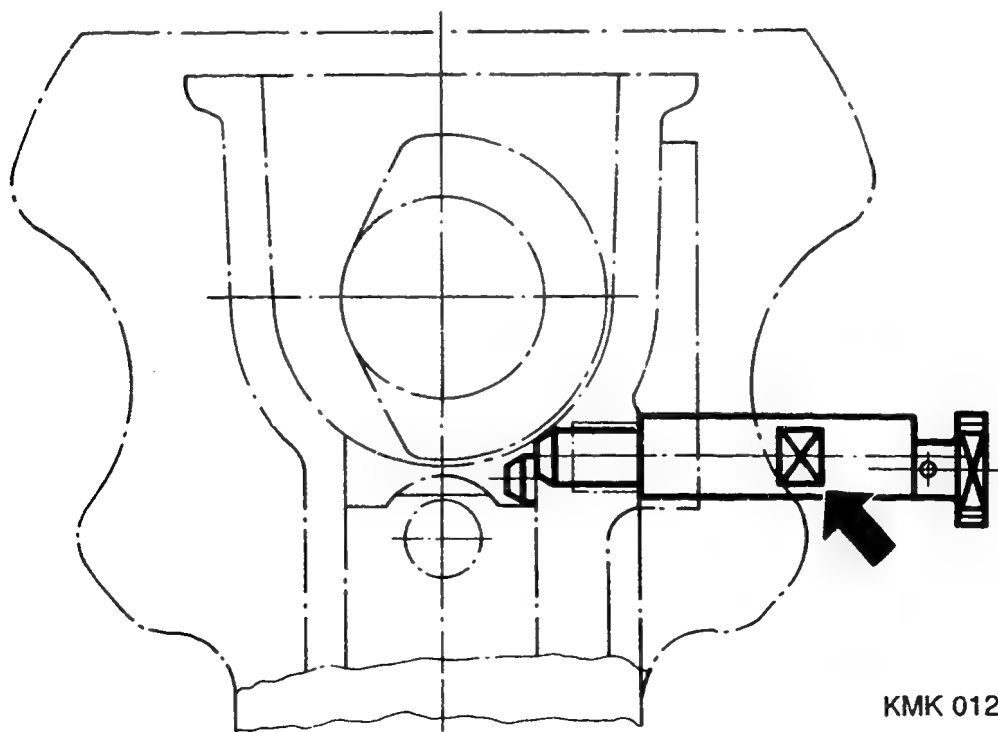
## INSTALLING TAPPET HOLDER

Before inserting tappet holders  
0 986 612 482, camshaft is to be  
turned to move respective roller tappet  
to OT position.

This opens up the mounting hole in  
the pump housing for insertion of  
the tappet holder.

Insert tappet holder into mounting hole  
until it makes contact with housing;  
turn camshaft slightly if necessary.

Continue: B12/1 Fig.: B11/2



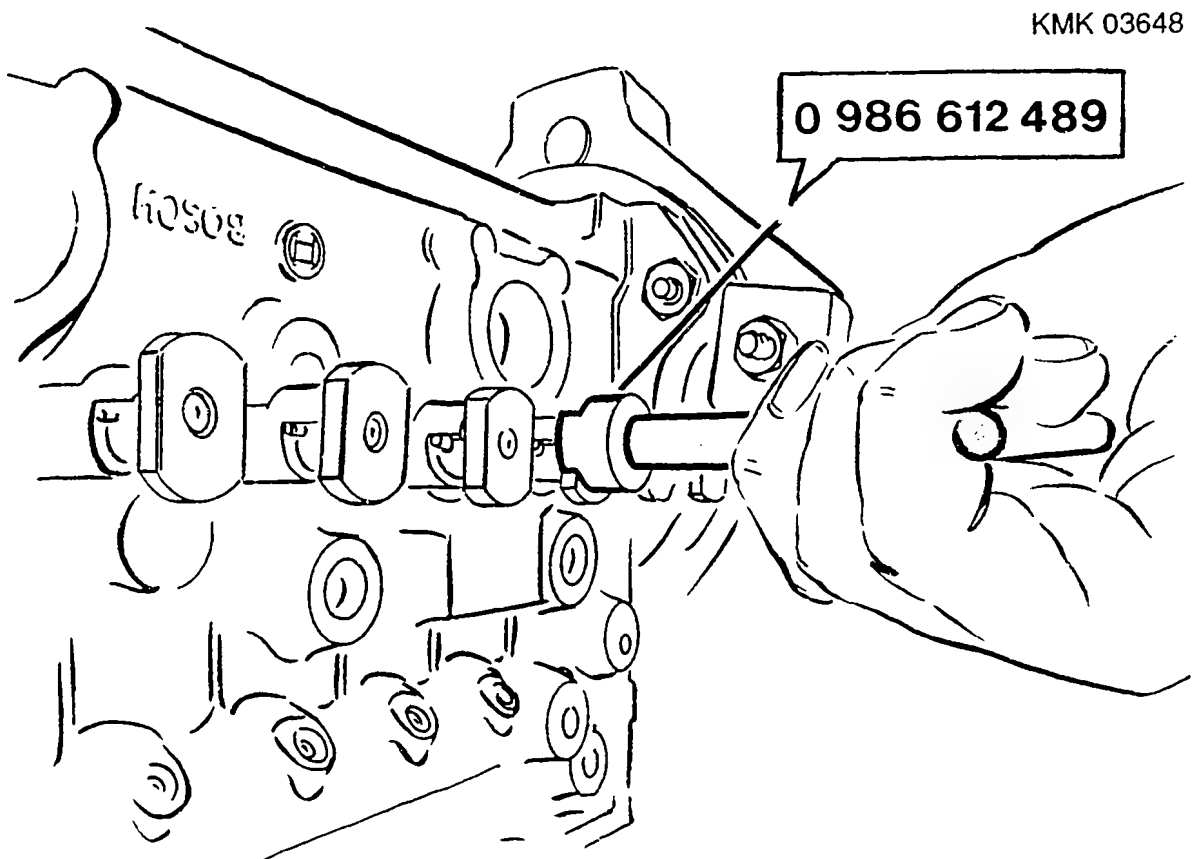
KMK 01224

## INSTALLING TAPPET HOLDER

The "0" marks on the body of the tool and on the end face of the modified handle point upwards (in direction of center of camshaft).

The milled keyways on the side must be perpendicular. After the tappet holder has been inserted, the socket wrench 0 986 612 489 is used to turn the eccentric shaft through 180 Grad. This lifts the roller tappet off the cam. Always counterhold at sleeve of tappet holder to prevent sleeve turning.

Continue: B13/1 Fig.: B12/2



## REMOVING DRIVE COUPLING

Hold drive coupling with wrench  
0 986 611 084 (KDEP 2885) and  
remove it.

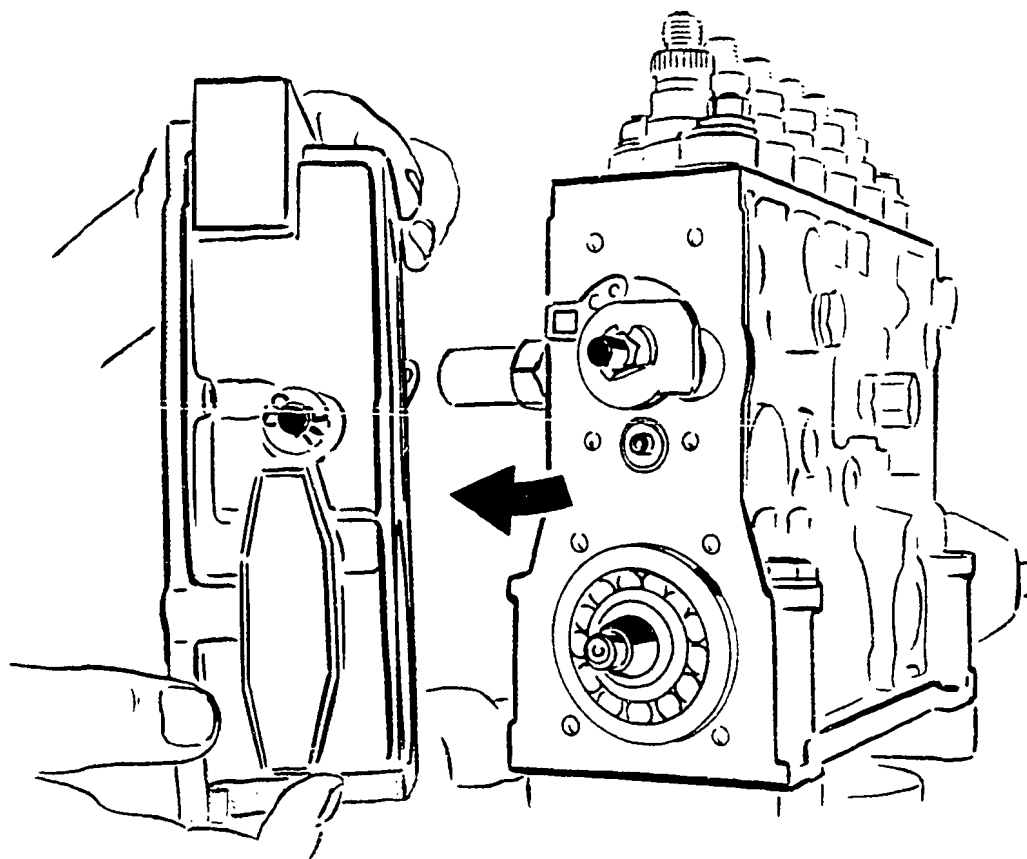
Continue: B14/1

## DISASSEMBLING GOVERNOR HOUSING

Loosen and screw out fastening screws  
of governor housing.

Remove governor housing; take off seal.

Continue: B15/1 Fig.: B14/2



KMK 01225

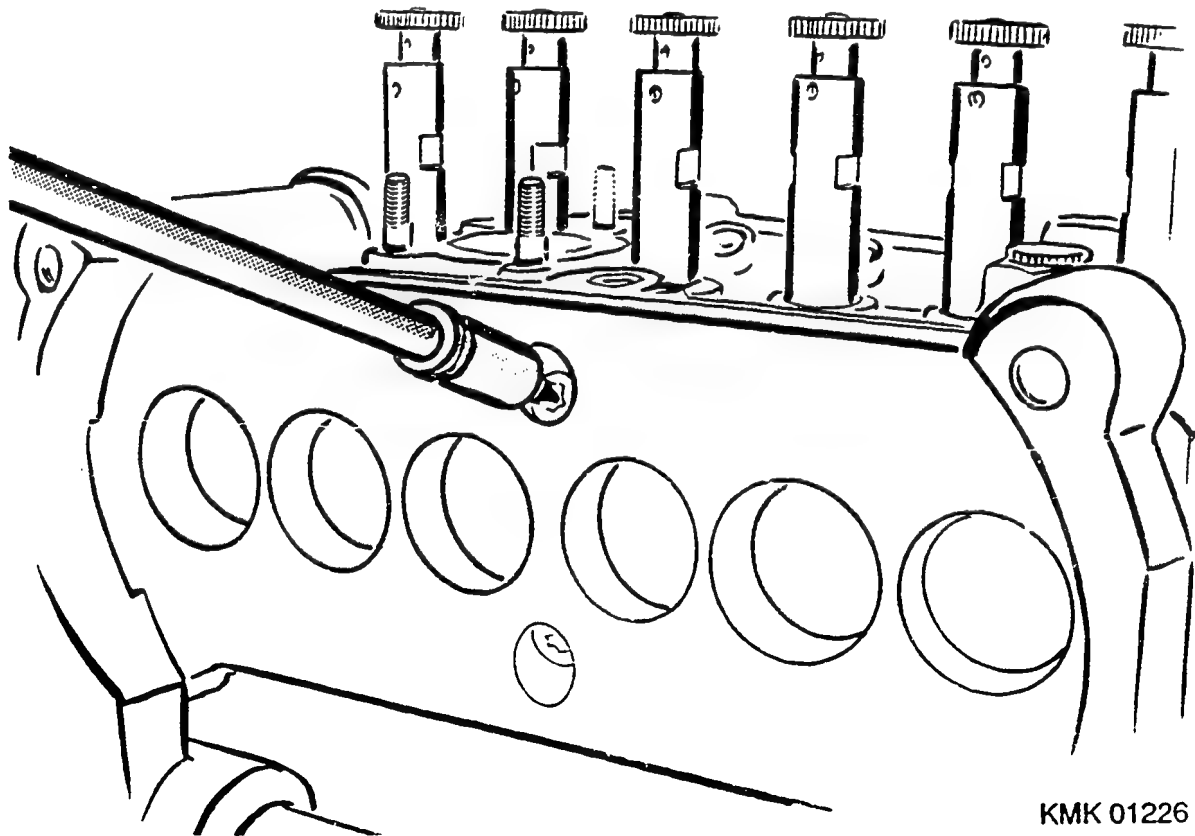
## REMOVAL OF CAMSHAFT

Loosen fastening screws of camshaft intermediate bearing and screw out. Remove resilient sleeves.

### Note:

Fastening screws are to be scrapped and replaced with new ones.

Continue: B16/1 Fig.: B15/2



KMK 01226



**REMOVING CAMSHAFT  
- SELF-ALIGNING ROLLER BEARING**

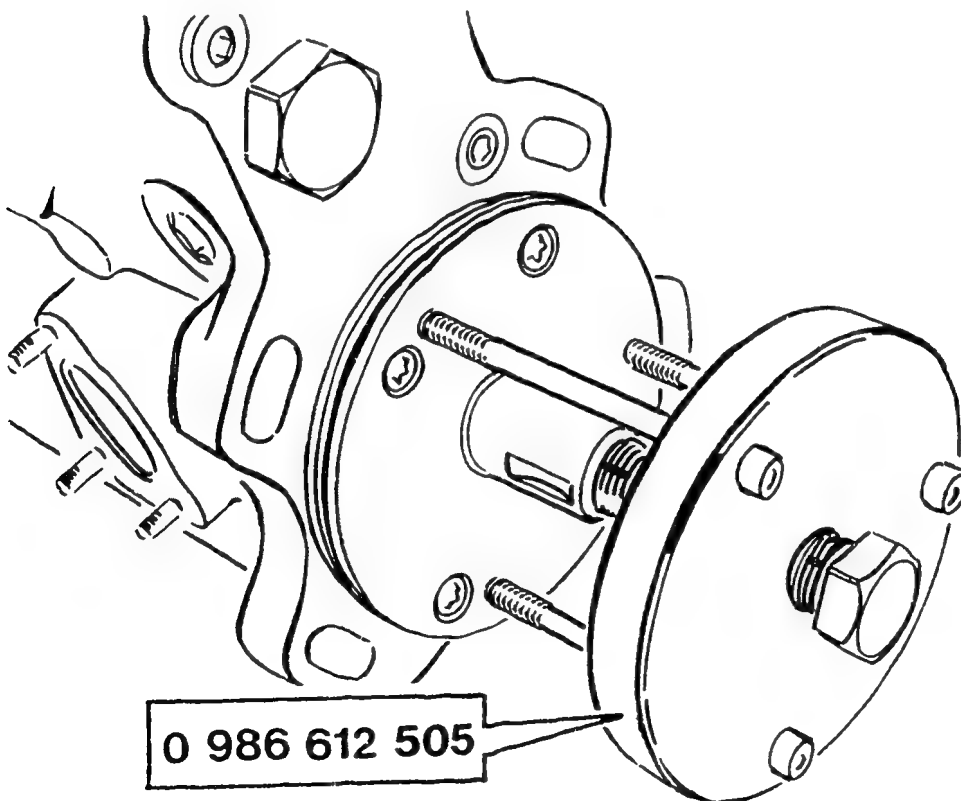
Loosen and screw out fastening screws of bearing end plate.

Attach puller 0 986 612 505 with three fastening screws M6 to bearing end plate.

Turn pressing-off screw (M16x1.5) against camshaft until bearing end plate can be removed from pump housing.

Continue: B17/1 Fig.: B16/2

KMK 03649

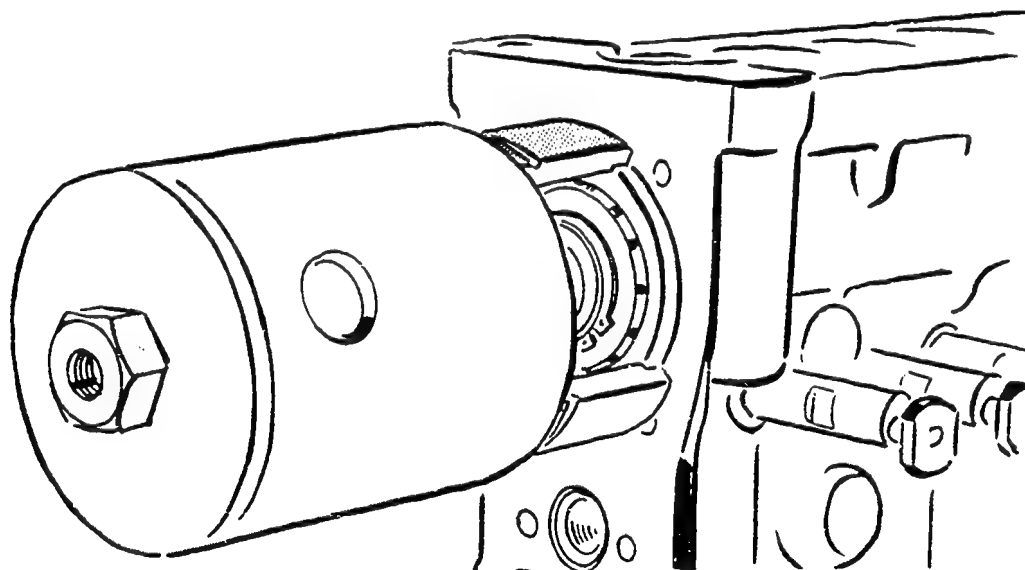


REMOVAL OF CAMSHAFT  
- SELF-ALIGNING ROLLER BEARING

Insert 2-piece spring collet of puller  
0 986 612 107 (KDEP 1569) in annular  
groove at outer race of camshaft  
bearing on governor end.

Position bell end of puller such that  
it makes contact with pump housing.

Continue: B18/1 Fig.: B17/2



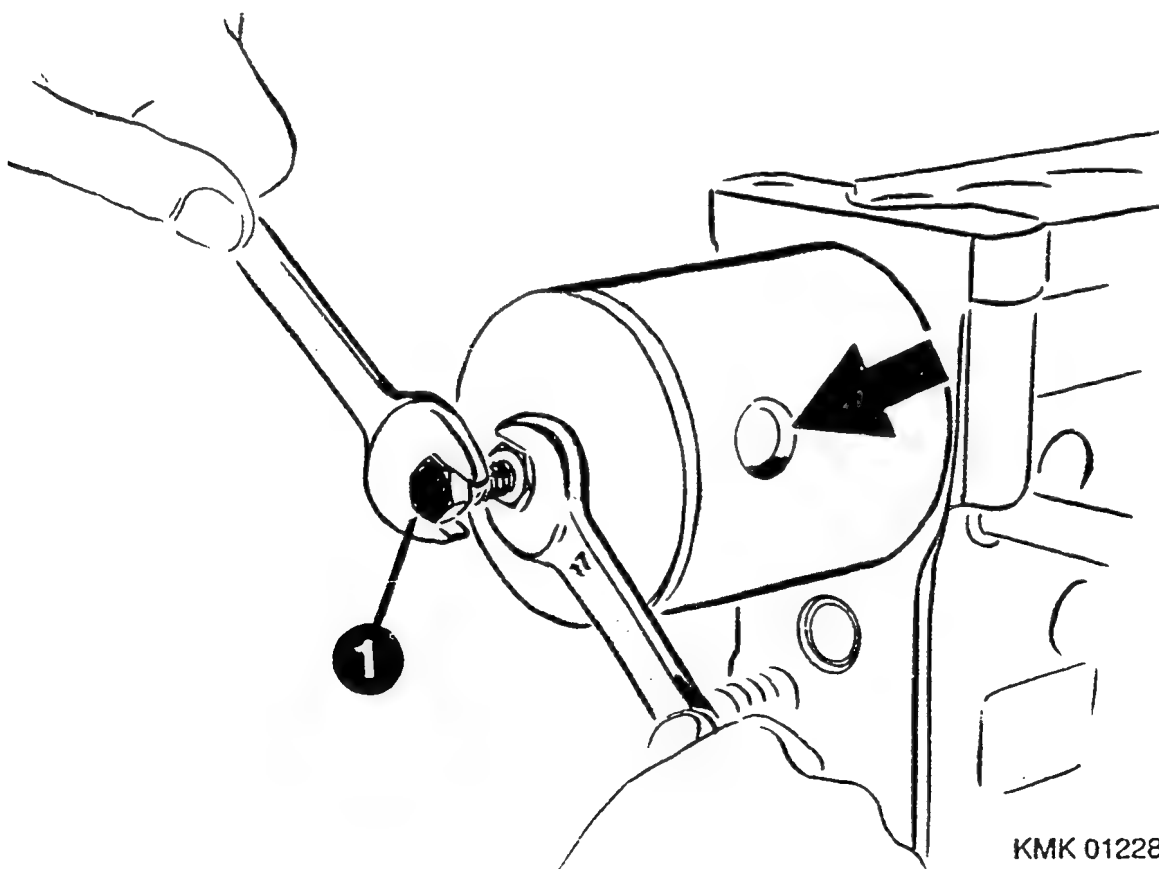
KMK 01227

REMOVAL OF CAMSHAFT  
- SELF-ALIGNING ROLLER BEARING

Insert puller screw with nut through central bore in bell end of puller 0 986 612 107 (KDEP 1569) and screw into support plate of inner collet. Check position through inspection hole in bell end (arrow).

To pull out bearing with camshaft, hold screw with open-end wrench and turn (1) nut with second wrench.

Continue: B19/1 Fig.: B18/2



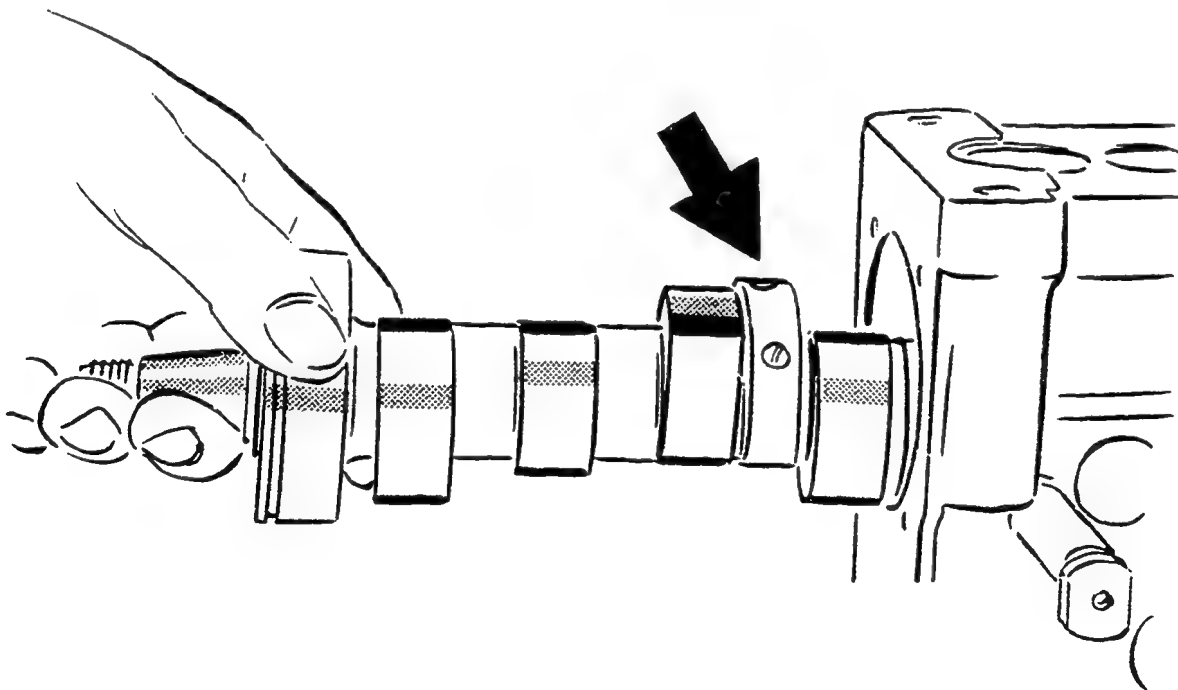
**REMOVAL OF CAMSHAFT  
- SELF-ALIGNING ROLLER BEARING**

Remove puller 0 986 612 107 (KDEP 1569) from camshaft bearing as soon as this has been pulled out of pump housing.

**C A R E F U L L Y** pull camshaft with bearing and intermediate bearing (arrow) out of pump.

Remove intermediate bearing from camshaft and lay it aside.

Continue: B20/1 Fig.: B19/2

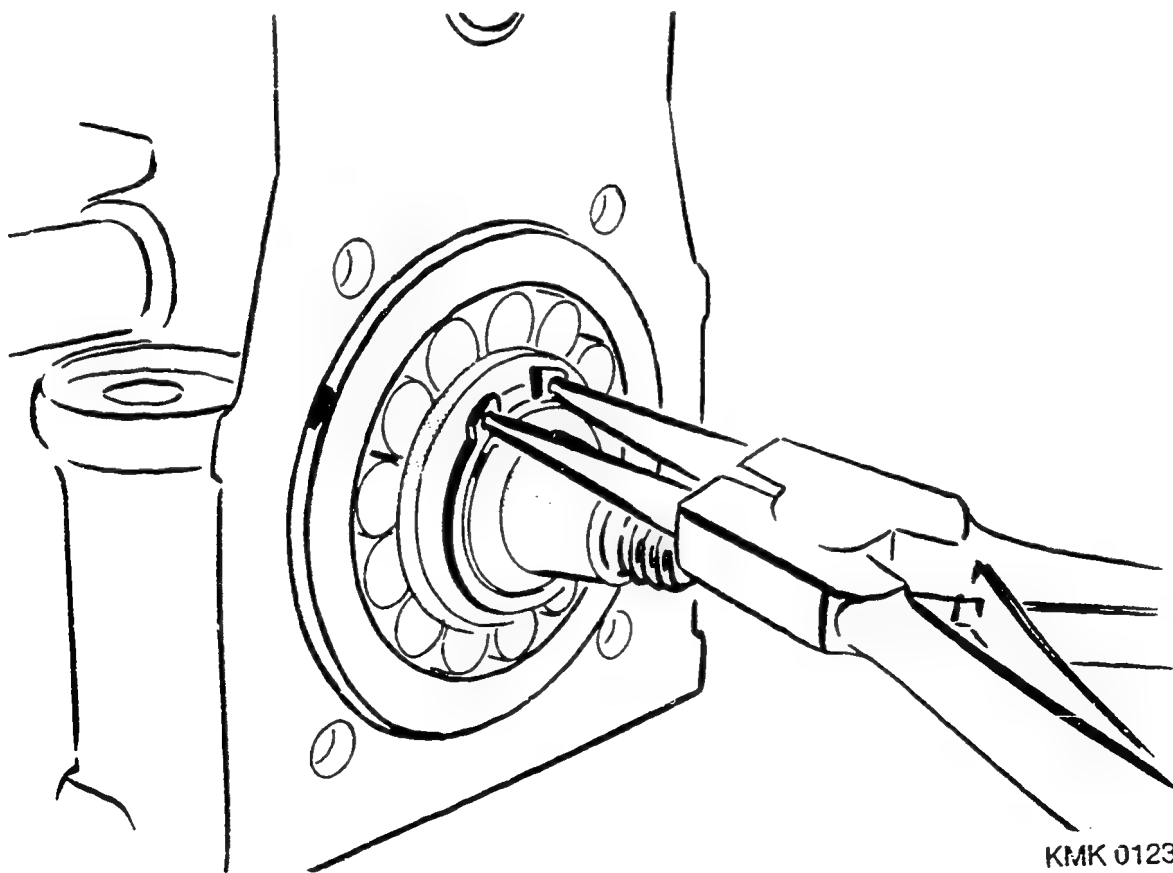


KMK 01229

**REMOVAL OF CAMSHAFT  
- CYLINDRICAL-ROLLER BEARING**

Remove retaining ring of camshaft bearing from camshaft.

Continue: B21/1 Fig.: B20/2

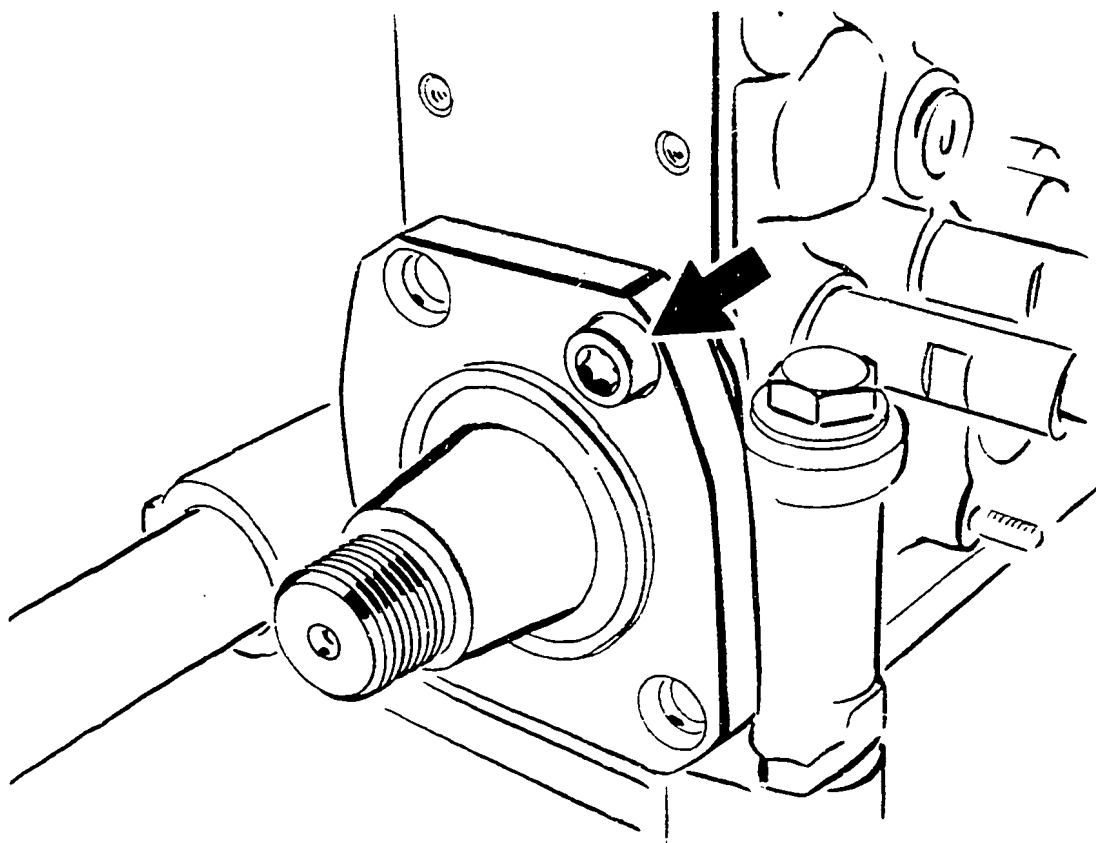


KMK 01231

REMOVAL OF CAMSHAFT  
- CYLINDRICAL-ROLLER BEARING

Loosen and screw out fastening screws  
(arrow) of bearing end plate.

Continue: B22/1 Fig.: B21/2

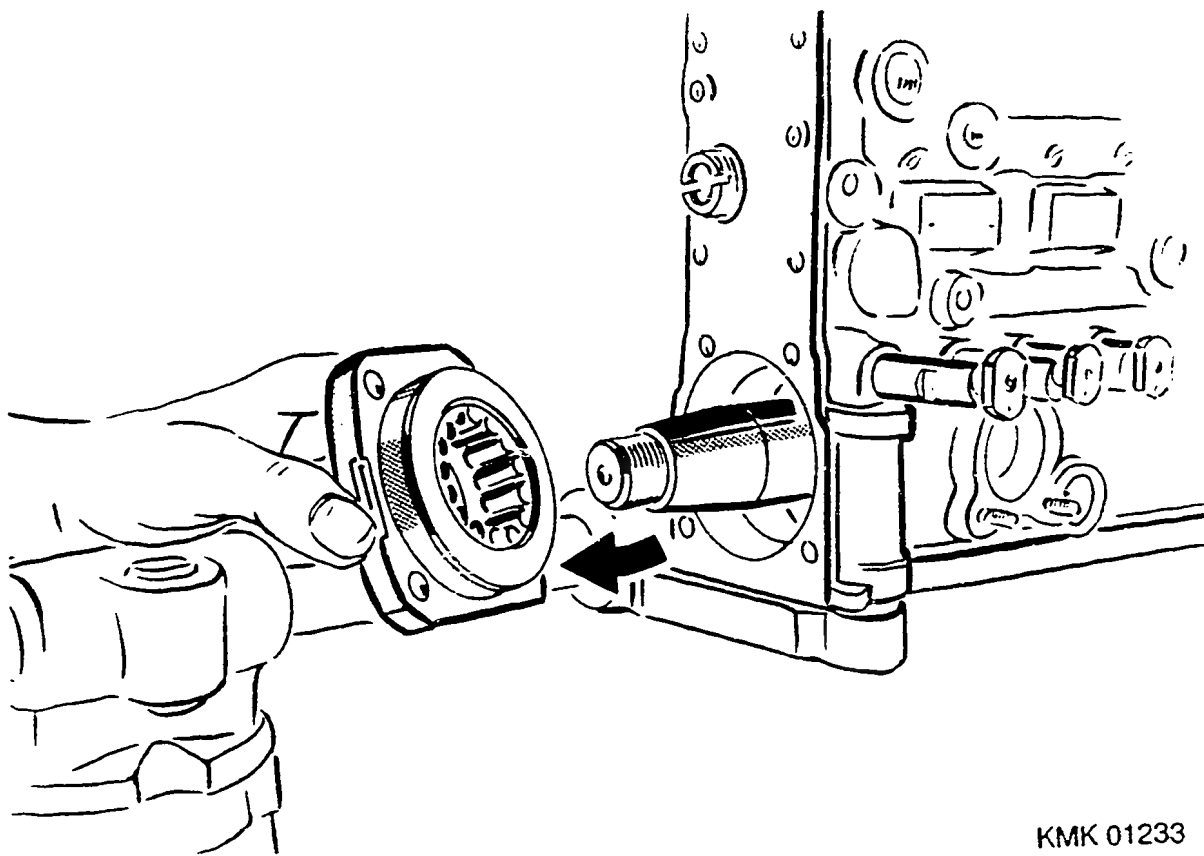


KMK 01232

REMOVAL OF CAMSHAFT  
- CYLINDRICAL-ROLLER BEARING

Remove bearing end plate.

Continue: B23/1 Fig.: B22/2



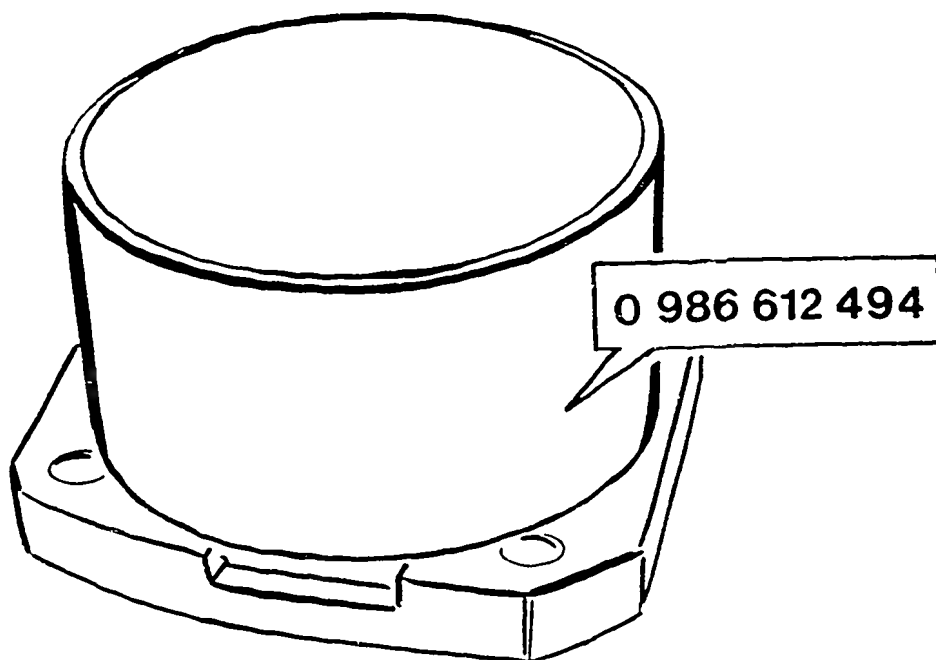
KMK 01233

REMOVING CAMSHAFT  
- CYLINDRICAL-ROLLER BEARING

Attach 0 986 612 494 (see picture) to bearing end plate removed so as not to lose rollers of bearing.

Continue: B24/1 Fig.: B23/2

KMK 01234





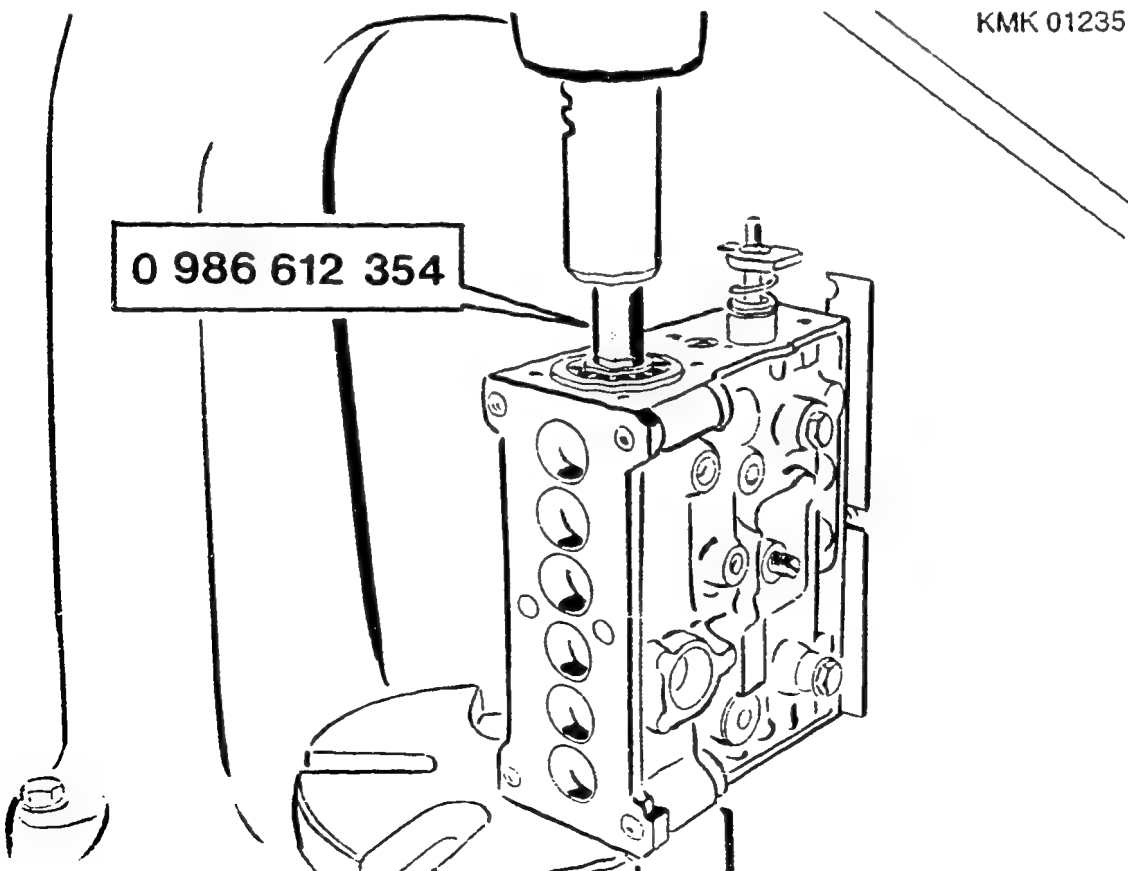
**REMOVING CAMSHAFT  
- CYLINDRICAL-ROLLER BEARING**

Place pump (drive end) on screw press.  
Attach 0 986 612 354 (KDEP 1735)  
on governor end to camshaft and  
press out camshaft.

**C A R E F U L L Y** remove camshaft from  
pump housing.

Remove intermediate bearing from  
camshaft and set it aside.

Continue: B25/1 Fig.: B24/2



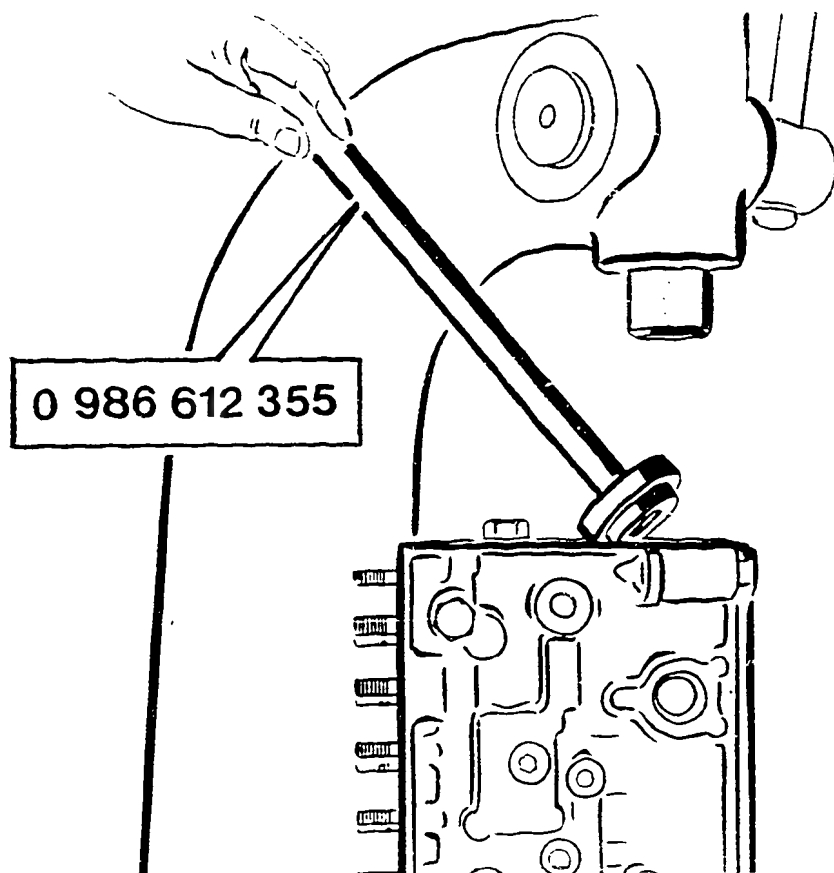
## REMOVING CAMSHAFT - CYLINDRICAL-ROLLER BEARING

Turn pump housing and position on governor end. Insert 0 986 612 355 (KDEP 1736) into camshaft chamber and press outer race of roller bearing out of pump housing.  
(Pay attention to precise position of pressing-out disk!)

### Note:

The pressing-out procedure described deforms the governor-end roller bearing. Use is therefore to be made of a N E W roller bearing.

Continue: B26/1 Fig.: B25/2



KMK 01236

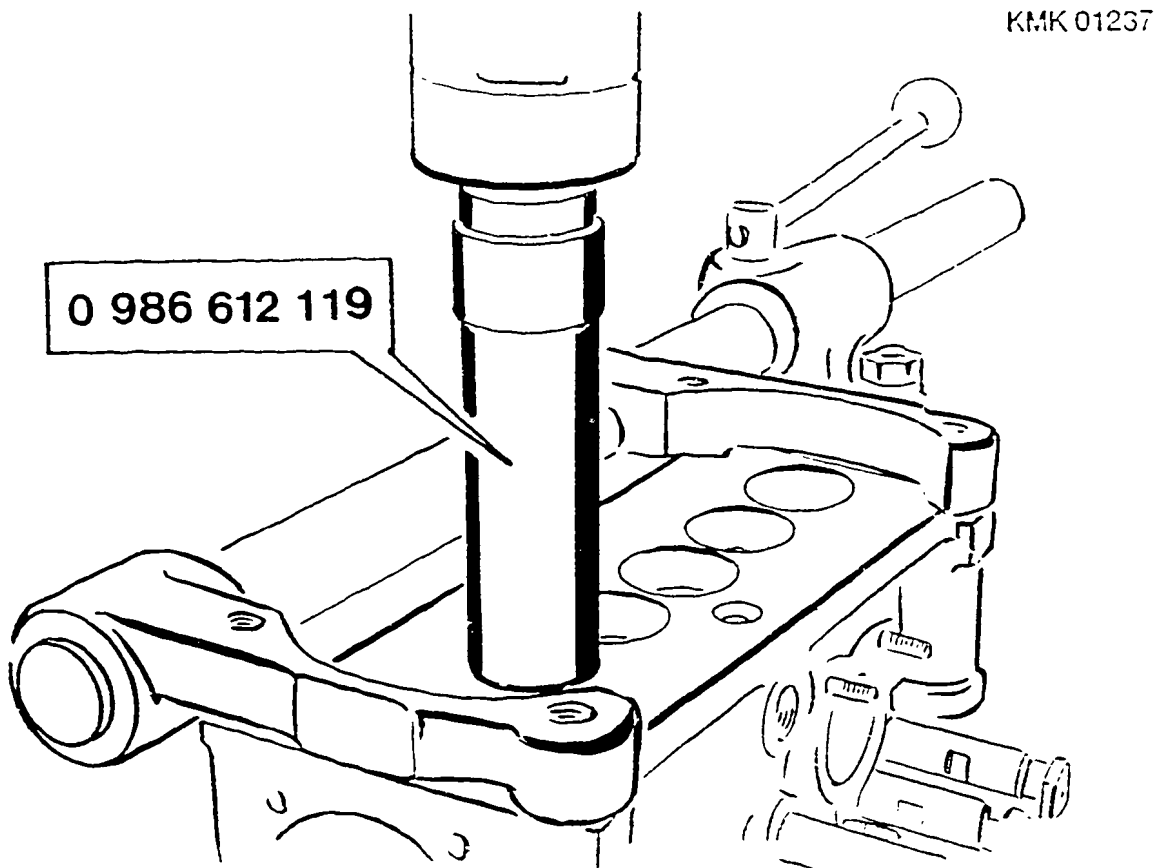
## REMOVING BOTTOM END COVERS

Use pressing-in mandrel 0 986 612 119 (KDEP 1574) to knock bottom end covers inwards into camshaft chamber in pump housing and remove.

### Note:

This operation destroys the bottom end covers which have to be renewed.

Continue: B27/1 Fig.: B26/2



## ROLLER-TAPPET REMOVAL

### Safety measure:

The procedure outlined in the Section "ROLLER-TAPPET REMOVAL" must be implemented with extreme caution. When carrying out this operation, there is a possibility of sudden tappet-spring release and thus a DANGER OF INJURY !

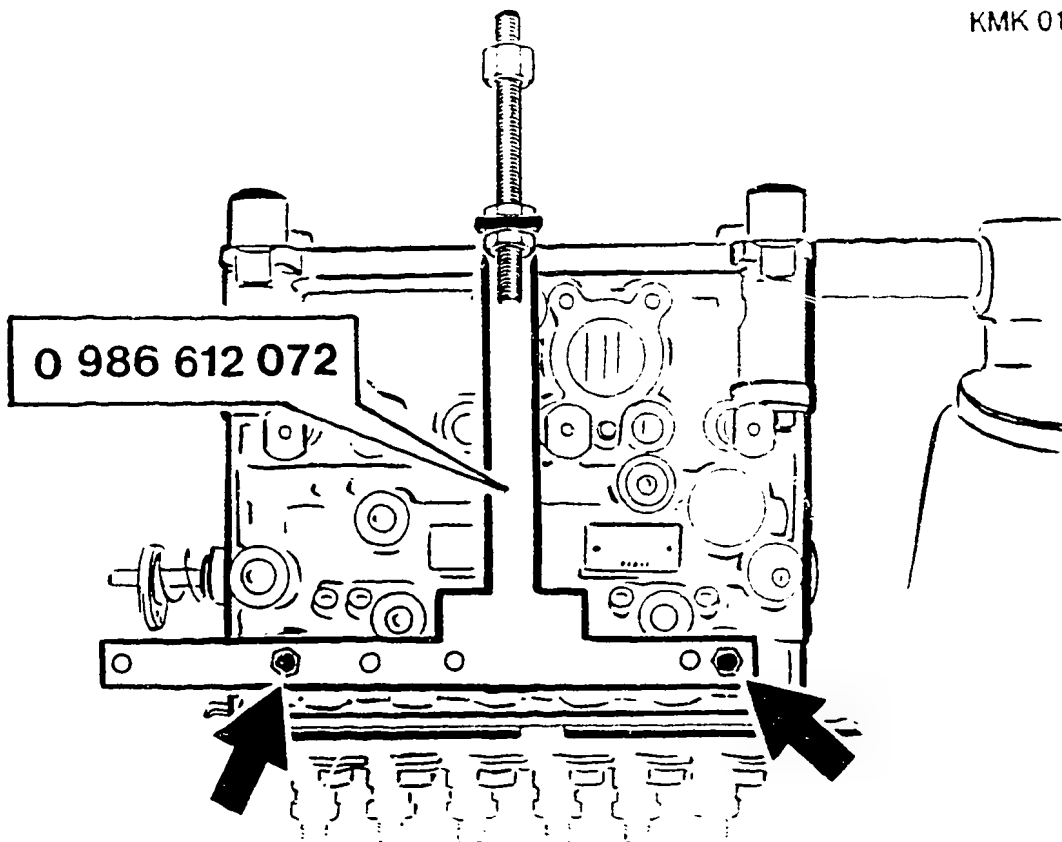
Continue: B28/1

## REMOVING ROLLER TAPPET

Attach assembly device 0 986 612 072  
(KDEP 1556) to pump housing.

To do so, screw fastening screws  
(arrows) into tapped holes in fuel  
inlet/return and tighten.

Continue: C01/1 Fig.: B28/2



KMK 01238

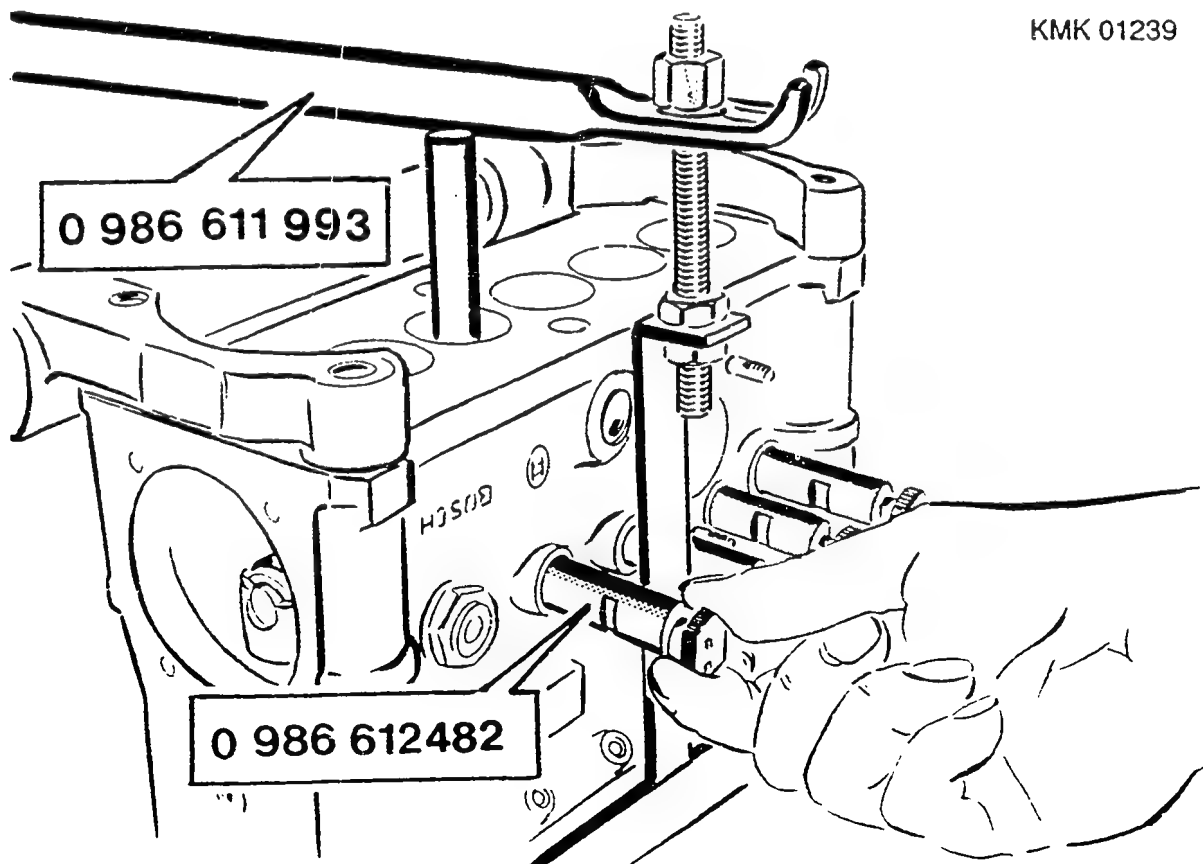
## REMOVING ROLLER TAPPET

Attach pipe lever of assembly tool  
0 986 611 993 (KDEP 1505) to  
retaining pin of assembly device  
0 986 612 072 (KDEP 1556).

Position thrust pin on roller of  
first roller tappet and press lever  
downwards as far as it will go.

Remove tappet holder 0 986 612 482 and  
place it aside.

Continue: C02/1 Fig.: C01/2



## REMOVING ROLLER TAPPET

Carefully move pipe lever of assembly device upwards again and thus relieve tension on plunger return spring.

This process is to be repeated for each pump tappet.

Remove assembly device 0 986 612 072 (KDEP 1556) again.

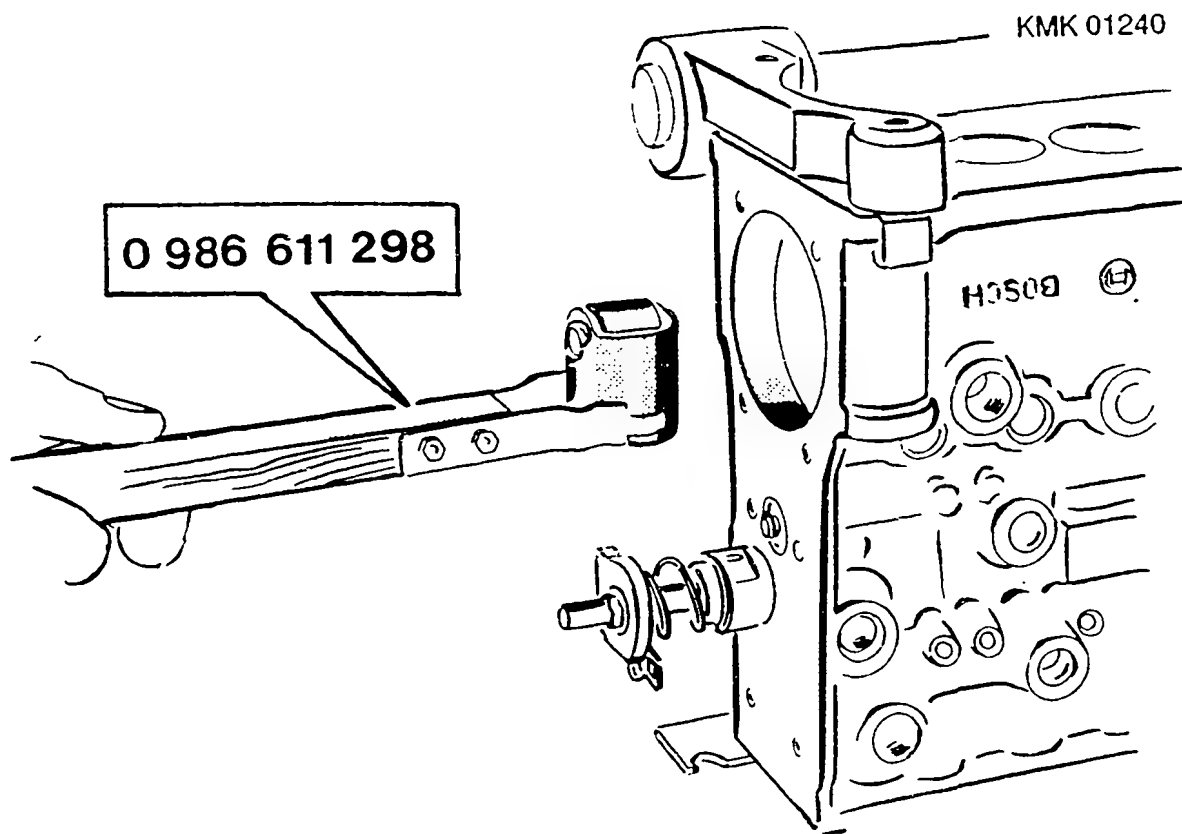
Continue: C03/1

## REMOVING ROLLER TAPPET

Remove roller tappet with  
0 986 611 298 (KDEP 2941, see  
picture).

This process is to be repeated for  
each pump barrel.

Continue: C04/1 Fig.: C03/2



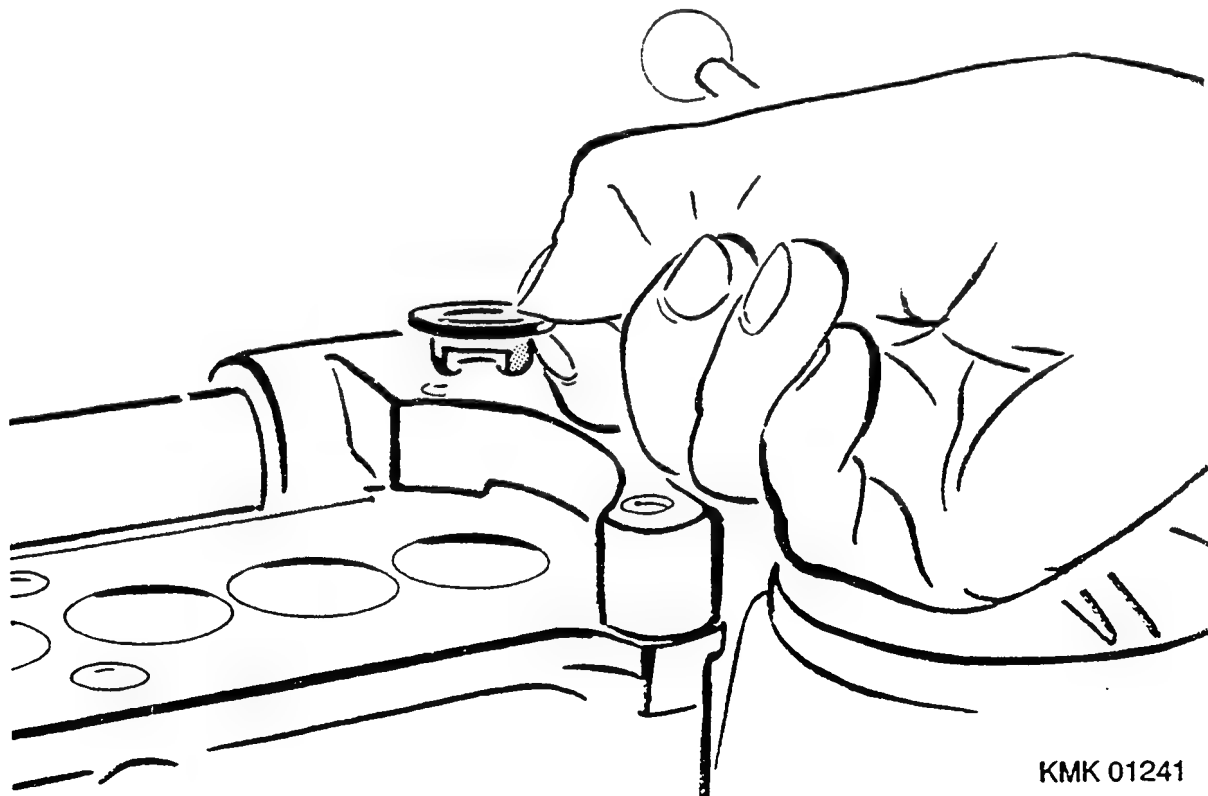


## REMOVING LOWER SPRING SEAT

Remove lower spring seat.

This procedure is to be repeated for each pump barrel.

Continue: C05/1 Fig.: C04/2



KMK 01241

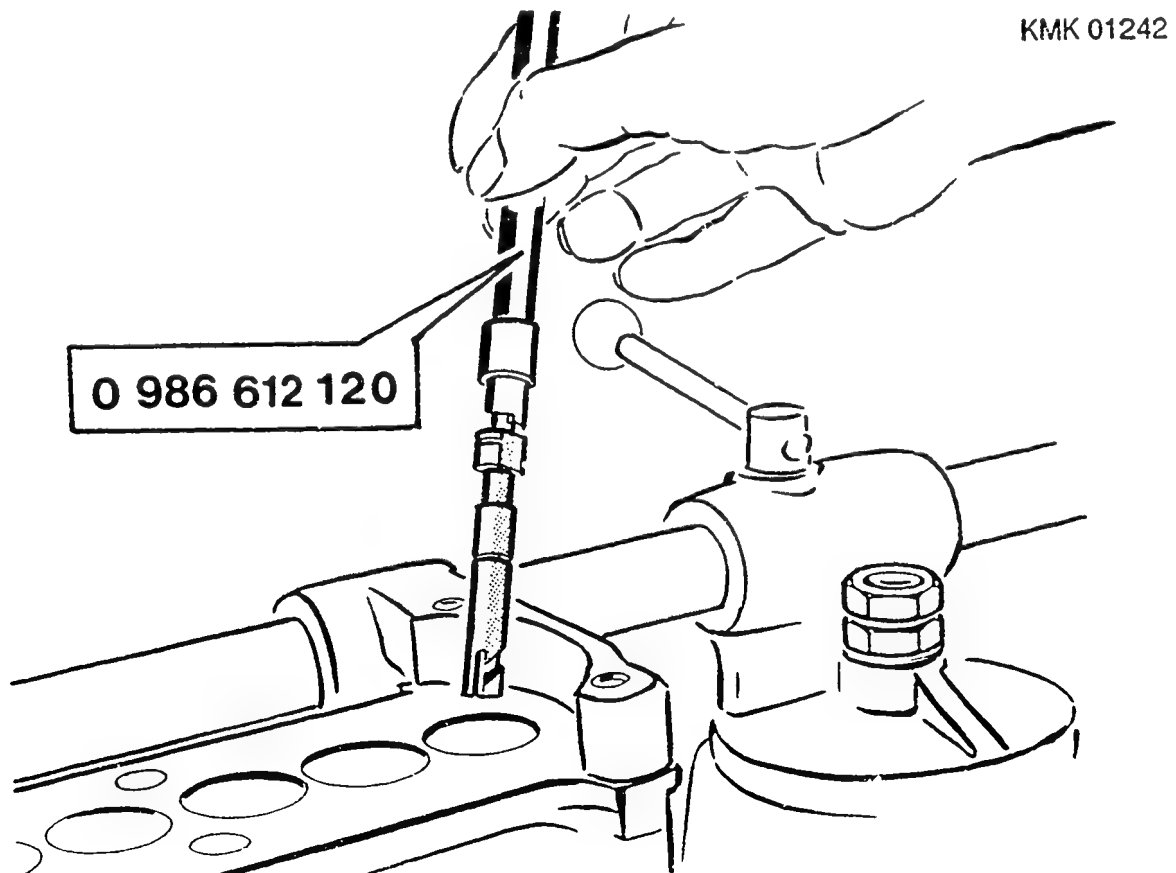
## REMOVING PUMP PLUNGER

Pull pump plunger out of pump barrel with pliers 0 986 612 120 (KDEP 1575) and set aside.

### CAUTION:

Pump plungers are not to be interchanged, i.e. all parts belonging to one barrel must be set down together.

Continue: C06/1 Fig.: C05/2

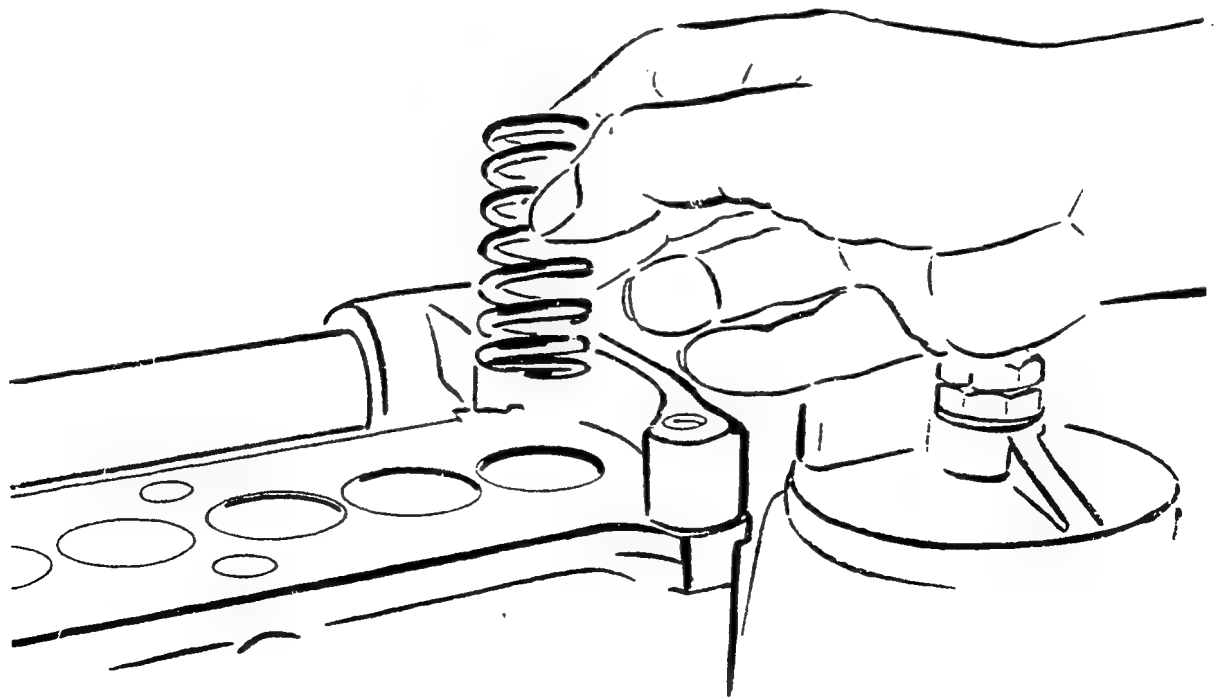


## REMOVING TAPPET SPRING

Remove tappet spring.

This procedure is to be repeated for each pump barrel.

Continue: C07/1 Fig.: C06/2



KMK 01243

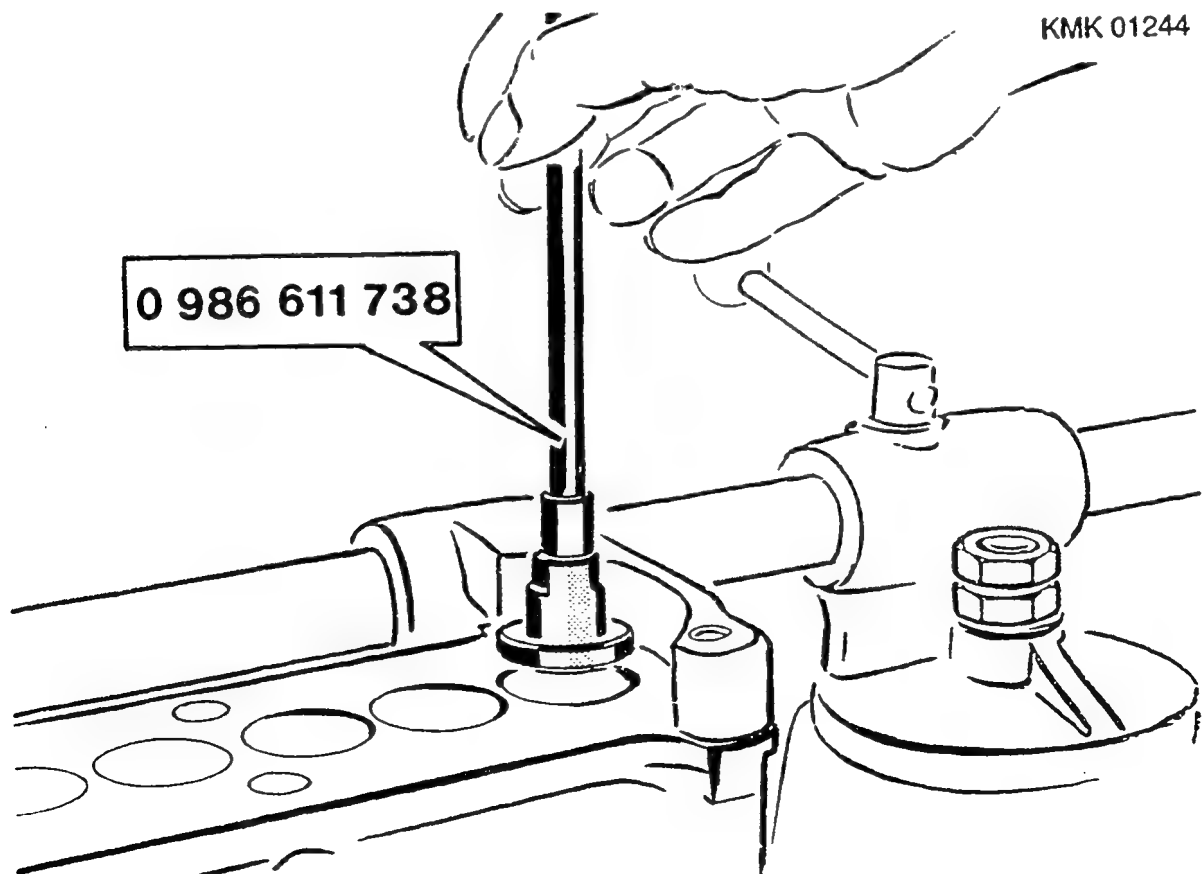
## REMOVING CONTROL SLEEVE AND SPRING SEAT

Use wrench 0 986 611 738 (KDEP 1071)  
to remove control sleeve and upper  
spring seat.

Control rod must be in centre position.

This process is repeated for each pump  
barrel.

Continue: C08/1 Fig.: C07/2



## DISASSEMBLING ROLLER TAPPET

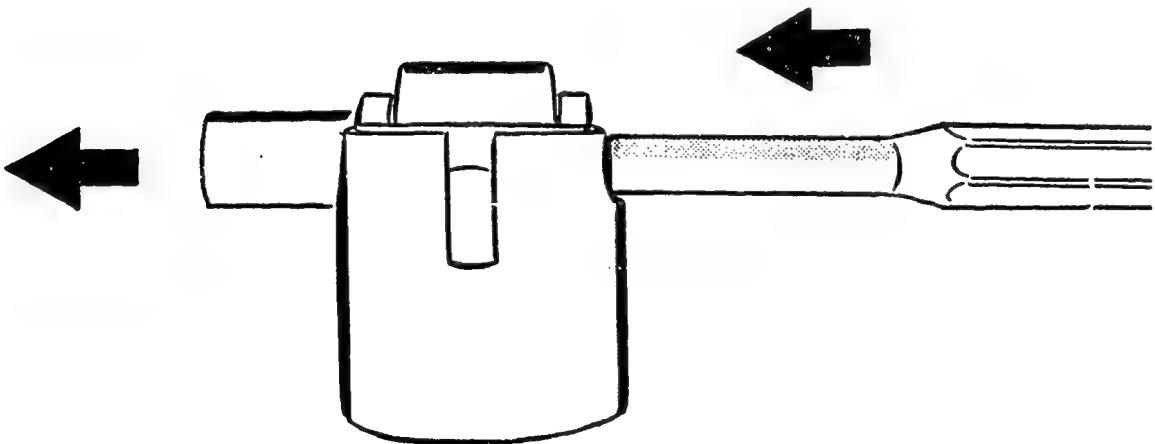
Knock roller pin out of roller tappet housing with punch (e.g. aluminium, brass).

### Note:

Position punch on secured side of roller pin.  
Scrap retainer following disassembly.

Continue: C09/1 Fig.: C08/2

KMK 03650



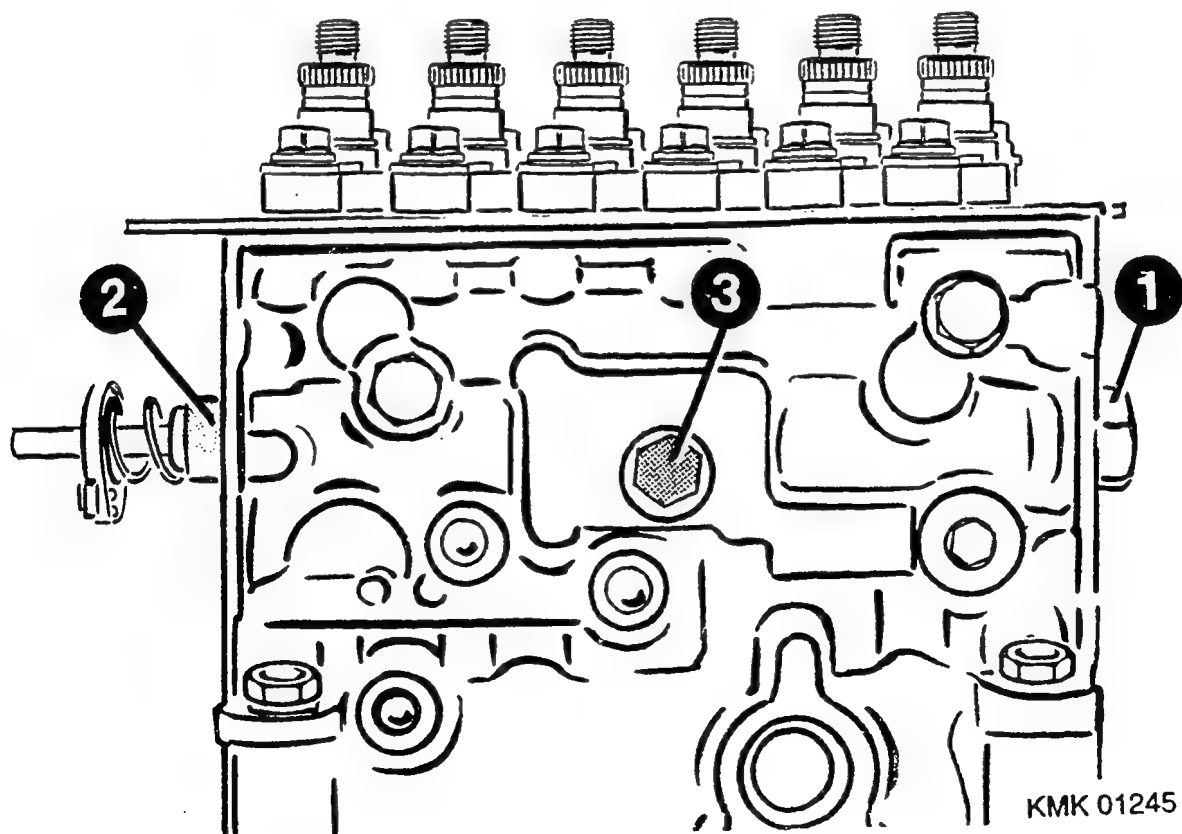
## REMOVING CONTROL ROD (RE-POSITIONER)

Unscrew control-rod screw plug (1).

Loosen control-rod nut (2) and pull control rod out of pump on governor end.

Loosen cap and lock nut (3) of control-rod guide screw and screw off.

Continue: C10/1 Fig.: C09/2



KMK 01245

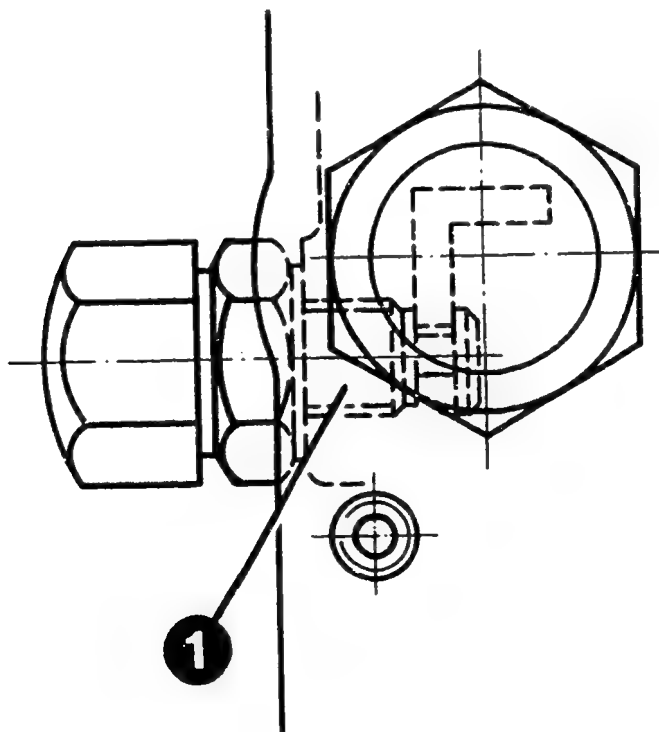
## REMOVING CONTROL ROD (RE-POSITIONER)

Screw out control-rod guide screw (1).

### Note:

The control-rod guide screw cannot be screwed out U N T I L the control rod has been removed.

Continue: C11/1 Fig.: C10/2

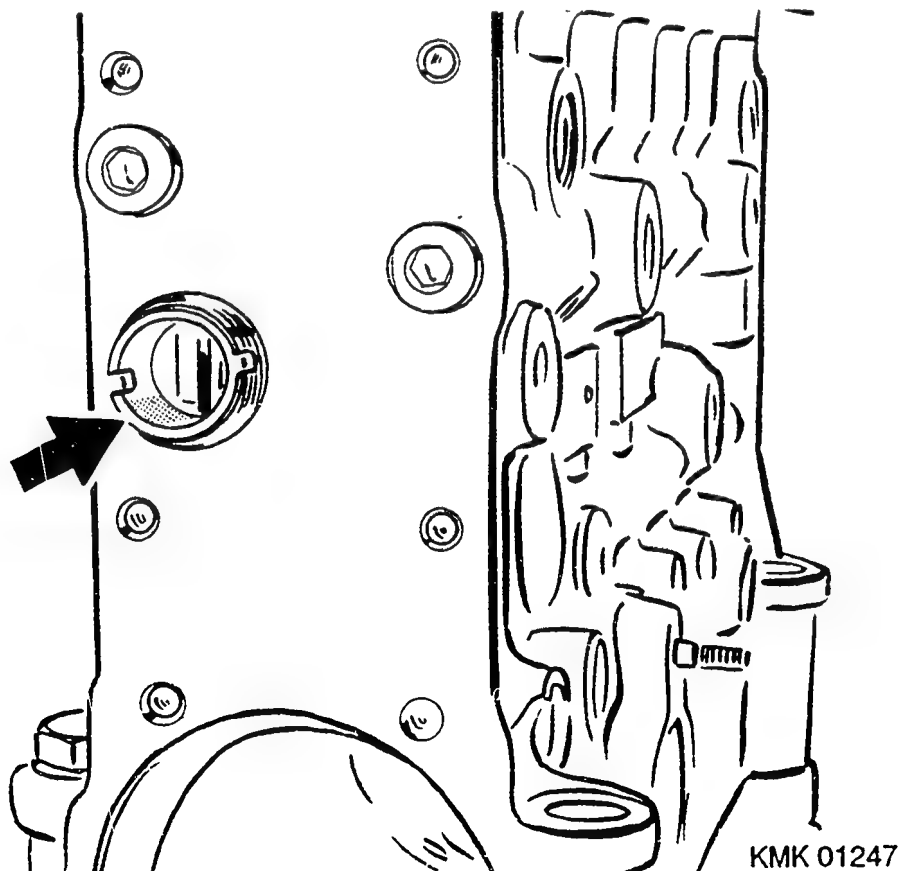


KMK 01246

## REMOVING CONTROL ROD (RE POSITIONER)

Use pin-type socket wrench  
0 986 612 129 (KDEP 1577) to remove  
threaded ring (arrow).

Continue: C12/1 Fig.: C11/2

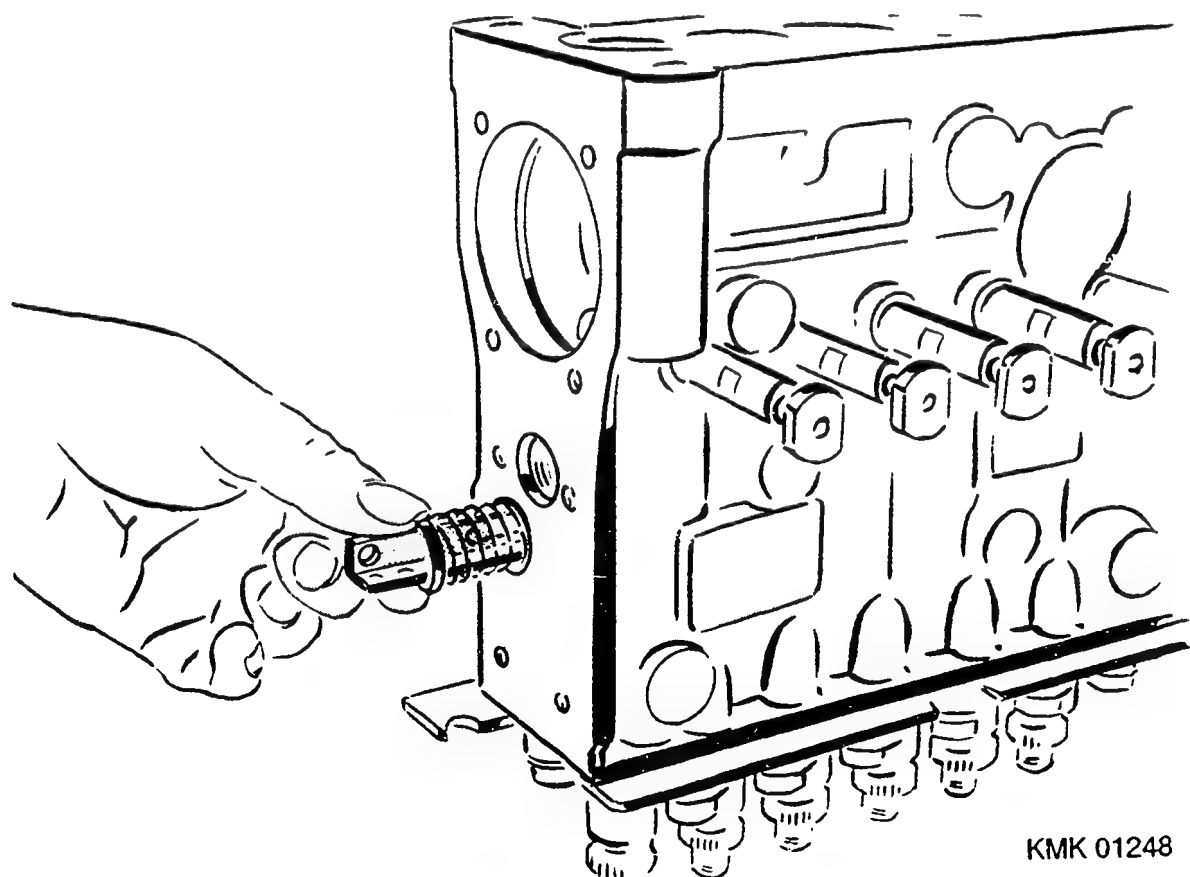




## REMOVING CONTROL ROD (MECHANICAL GOVERNOR)

Remove spring seat and play-compensating spring from control rod on governor end.

Continue: C13/1 Fig.: C12/2



KMK 01248

## REMOVING CONTROL ROD (MECHANICAL GOVERNOR)

Remove (picture a) threaded ring with pin-type socket wrench 0 986 612 129 (KDEP 1577).

Remove positioning pin (picture b - arrow).

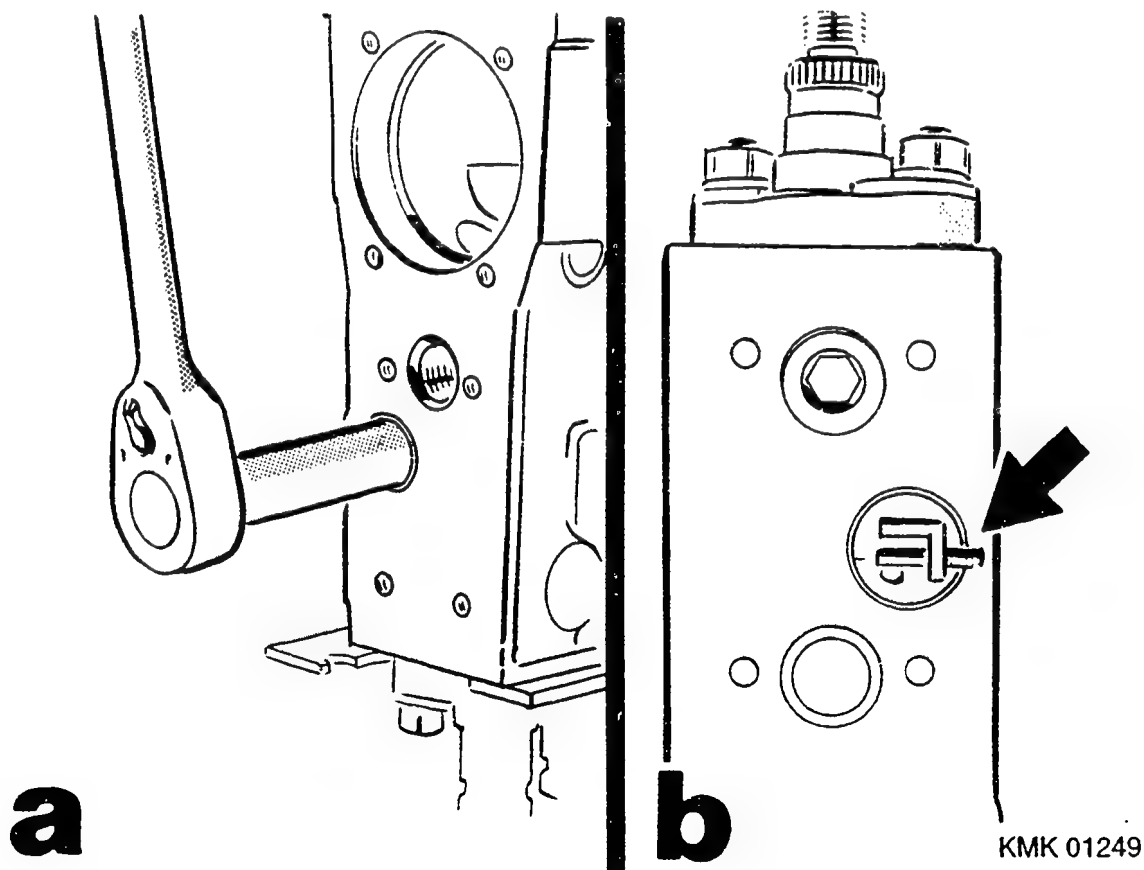
Pull out control rod away from drive end.

Remove control-rod screw plug on drive end and take out guide.

### Note:

If guide bushing sticks, push it out away from drive end with long mandrel.

Continue: C14/1 Fig.: C13/2



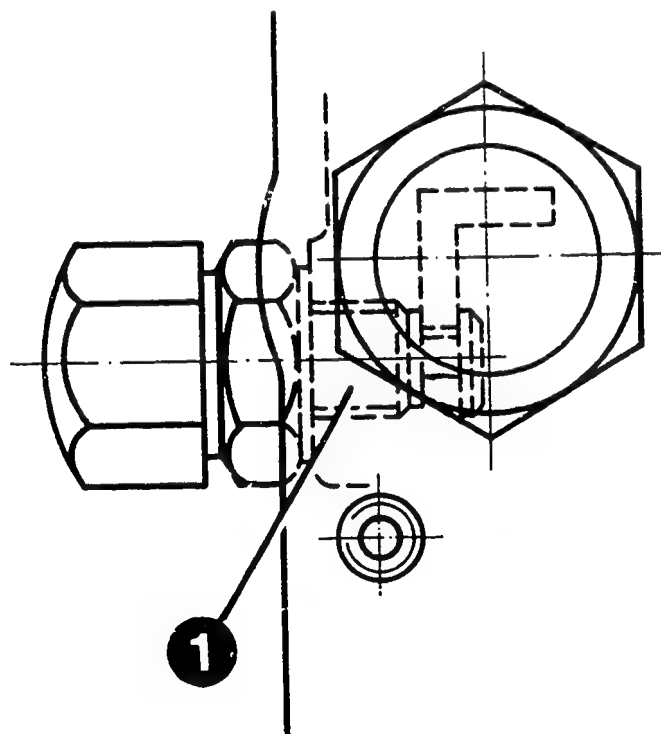
# REMOVING CONTROL ROD (MECHANICAL GOVERNOR)

Screw out control-rod guide screw (1).

## Note:

The control-rod guide screw cannot be screwed out **U N T I L** the guide rod has been removed.

Continue: C15/1 Fig.: C14/2



KMK 01246

## REMOVING BARREL-AND-FLANGE ELEMENT

Unscrew hexagon nuts of barrel-and-flange elements and remove spacers 0 986 612 061 (KDEP 1550) beneath flanges; then set aside.

Use puller 0 986 612 397 (KDEP 1763) to remove barrel-and-valve assemblies from pump housing.

Continue: C15/2

## REMOVING BARREL-AND-FLANGE ELEMENT

### Note:

When setting down the barrel-and-valve assemblies, pay attention to same sequence as that for removal of pump plungers.

Deliver-valve holder, pump plunger and pump barrel in barrel-and-valve assembly must not be mixed up.

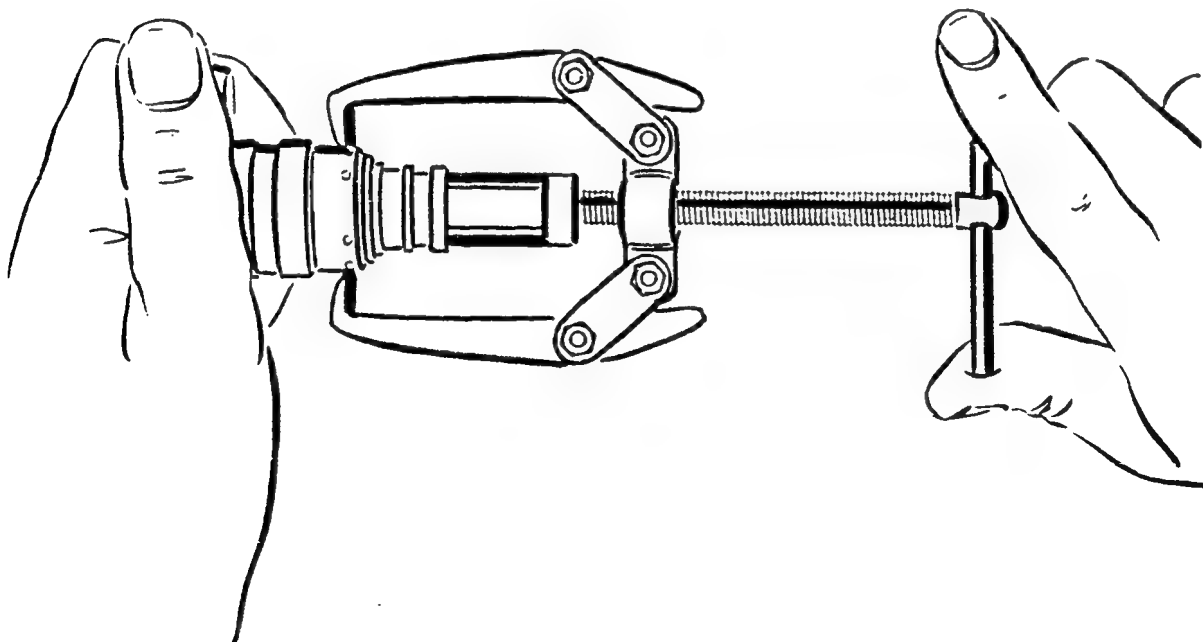
Continue: C16/1

## DISASSEMBLING BARREL-AND-FLANGE ELEMENT

Insert pins of puller 0 986 612 498 in opposing holes in impact cap and remove impact cap and retainer from element by turning spindle.

Continue: C17/1 Fig.: C16/2

KMK 03651



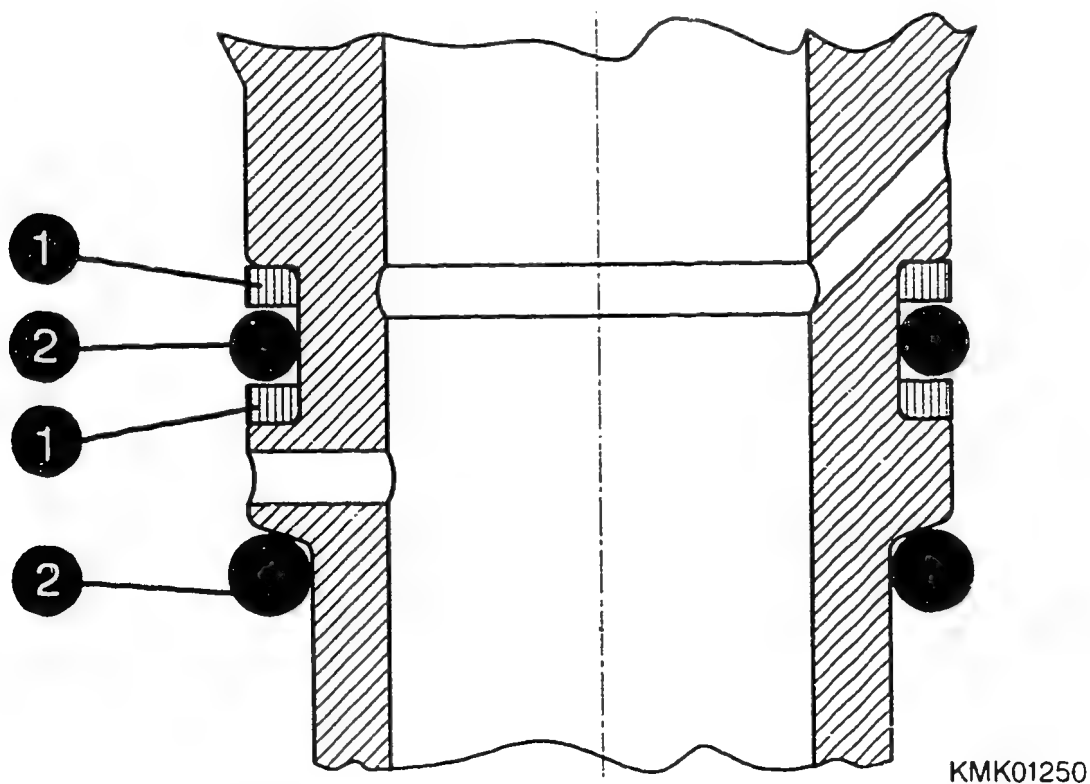
## DISASSEMBLING BARREL-AND-FLANGE ELEMENT

Remove support rings (1) and take off O-rings (2).

Note:

Retainer, support rings and O-rings are to be renewed.

Continue: C18/1 Fig.: C17/2



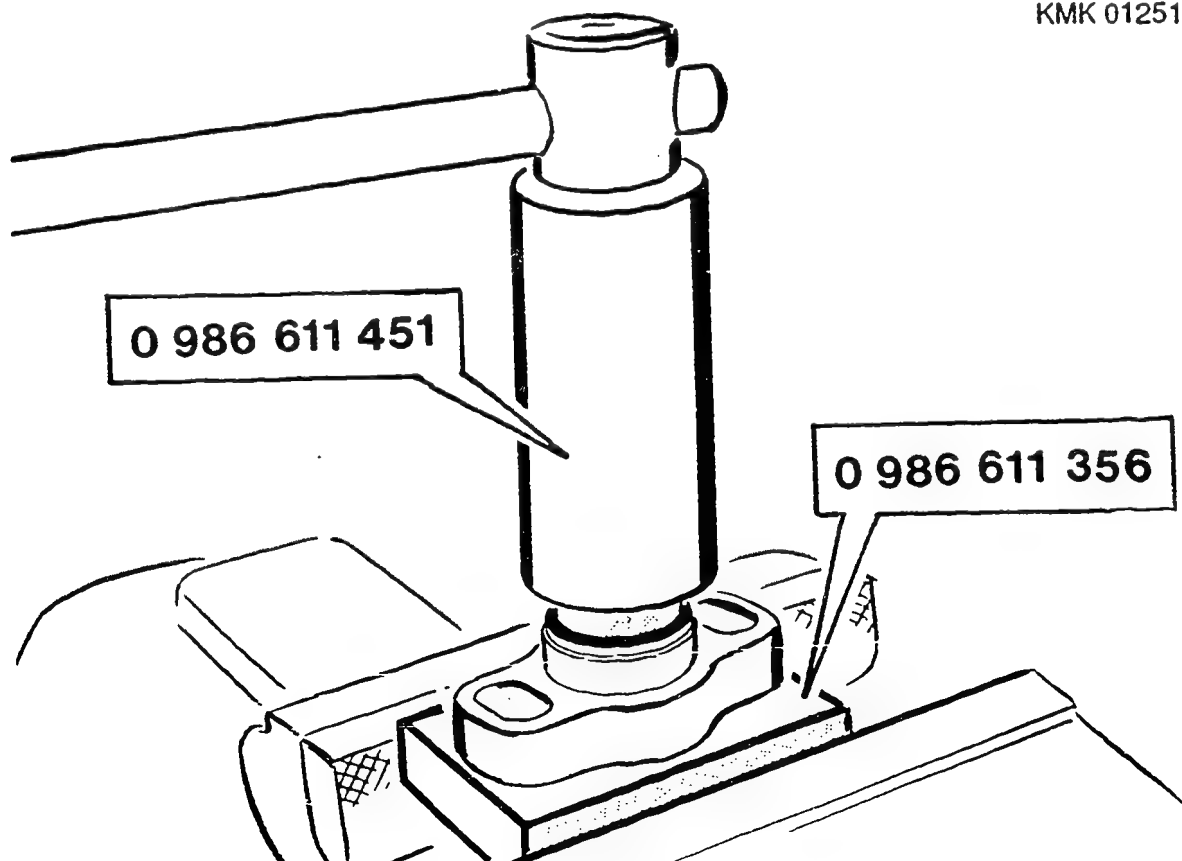
## DISASSEMBLING BARREL-AND-FLANGE ELEMENT

Place barrel-and-valve assembly in assembly device 0 986 611 356 (KDEP 2962).

Loosen and screw out delivery-valve holder with socket wrench 0 986 611 451 (KDEP 2986).

Continue: C19/1 Fig.: C18/2

KMK 01251



## DISASSEMBLING BARREL-AND-FLANGE ELEMENT

Remove valve spring with spring seat or filler piece from delivery-valve holder.

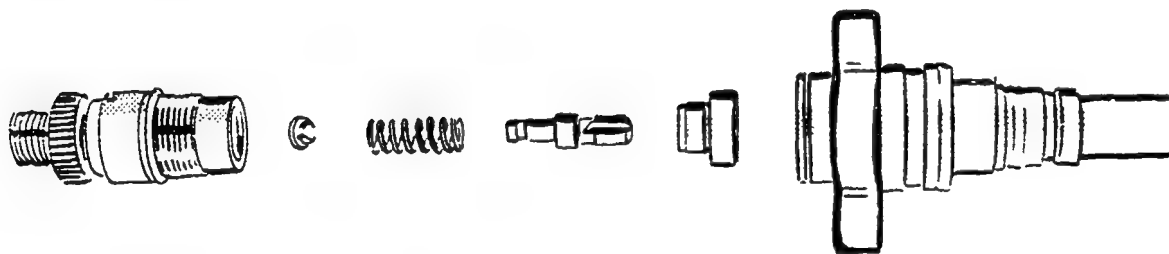
Remove O-ring from delivery-valve holder.

Remove constant-pressure valve from pump barrel.

### Note:

There is no seal between pump barrel and delivery-valve assembly on fuel-injection pumps of type P-8500.

Continue: C20/1 Fig.: C19/2



KMK 01252



## CLEANING OF PARTS

Wash out parts in commercially available cleaning agent, such as chlorothene NU, which is not readily flammable.

Pay attention to the following safety regulations !!!

In Germany:  
Order Governing Work with Combustible Liquids (Vbf) as published by Federal Labor Ministry (BmA).

Continue: C20/2

## SAFETY MEASURES

Safety regulations for handling chlorinated hydrocarbons

Companies ZH 1 / 222

Employees ZH 1 / 119

as published by the Hauptverband für Gewerbliche Berufsgenossenschaften (Zentralverband für Unfallschutz und Arbeitsmedizin), Langwartweg 103, 5300 Bonn 5, Germany.

As regards other countries, attention is to be paid to the appropriate local legislation.

Continue: C21/1

## CLEANING OF PARTS

Re-cut tapped fastening holes in pump housing for intermediate bearing and governor housing with tap, and then wash and blow out holes.

Continue: C22/1

CHECKING OF INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

Renew parts which are worn or damaged.

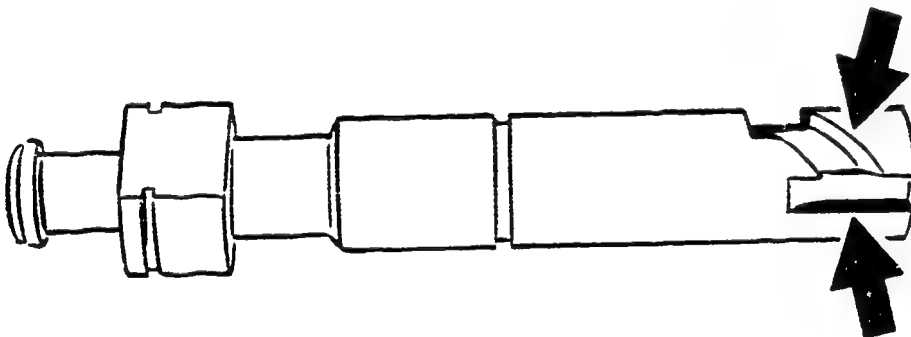
Always renew packing disks, O-rings  
and snap rings.

Pay particular attention to helices of  
pump plungers.

The helices must feature sharp edges  
and must not be rounded (arrows).

The bearing surfaces must not show any  
signs of tracking or scoring.

Continue: C23/1 Fig.: C22/2



KMK 01253

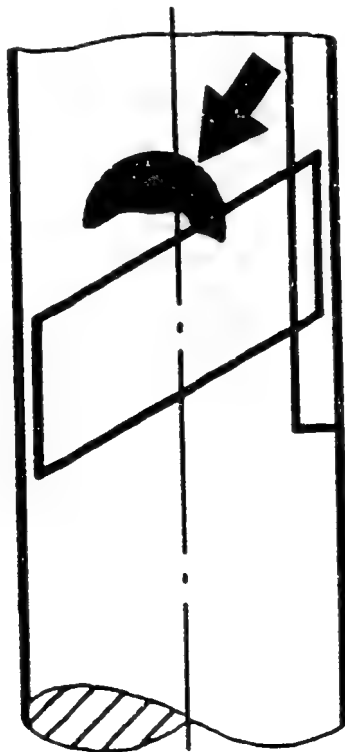
CHECKING OF INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

Pay attention to the following information, so as to avoid uncertainty regarding the assessment of plunger-and-barrel assemblies:

It is appropriate to renew the plunger-and-barrel assemblies in the event of:

- \* Cavitation in the area of the helices (arrow).
- \* Plunger-and-barrel seizure or sticking as a result of dirt or surface coating becoming apparent in slide test (plunger in barrel).

Continue: C24/1 Fig.: C23/2



KMK 01254

CHECKING OF INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

Note:

Wash out pump plunger and barrel in  
calibrating oil before performing  
slide test.

Hold pump plunger and barrel roughly  
perpendicular.

Pump plunger must slide downwards in  
barrel on account of its own weight.

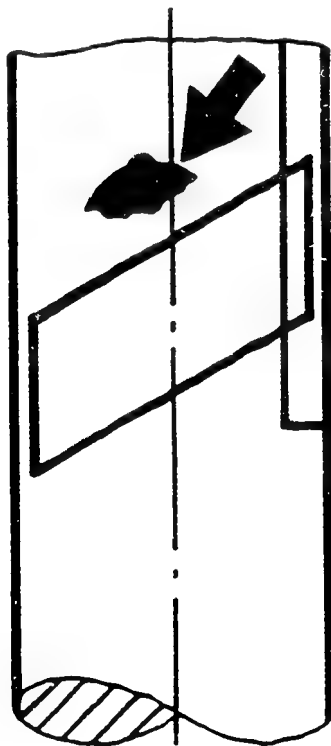
Continue: C25/1

## CHECKING OF INDIVIDUAL COMPONENTS - WEAR ASSESSMENT

Renewal of the plunger-and-barrel assemblies is not appropriate in the event of:

- \* Cavitation above the helices (arrow).
- \* Mat area around the entire periphery.
- \* Bright bearing surfaces (without scoring and mechanical wear).
- \* Discoloration at plunger and flange barrel as a result of fuel and lubricant residues, water in the fuel or the effect of temperature.

Continue: C26/1 Fig.: C25/2



KMK 01255

CHECKING INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

Note:

There is no seal between pump barrel and delivery-valve assembly on pumps of type P-8500.

Damage to the sealing surfaces is not permitted (as with all flanged-barrel pumps)!

Plunger-and-barrel assemblies and delivery-valve assemblies can be individually replaced when performing repairs.

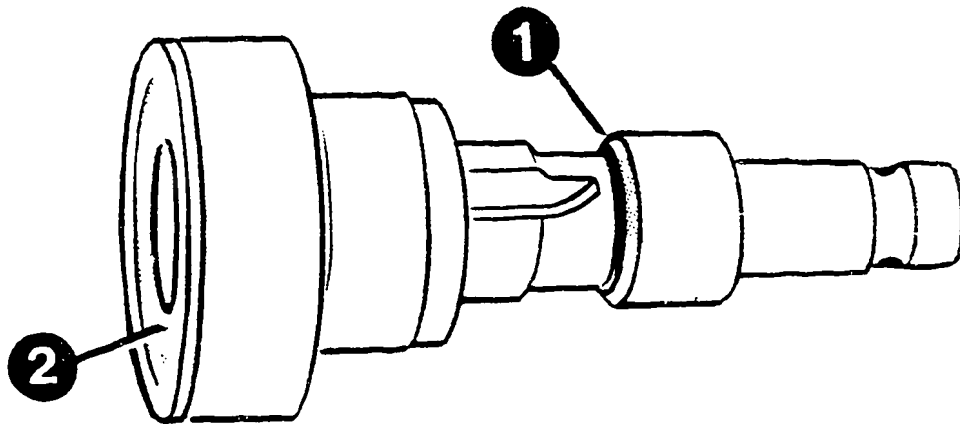
Continue: C27/1

CHECKING OF INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

The seat of the valve taper (1) and the sealing surface of the valve body (2) must not be dented, reveal cavitation or be unevenly worn.

Renew delivery valve if the valve sticks in the valve holder.

Continue: C28/1 Fig.: C27/2



KMK 01256



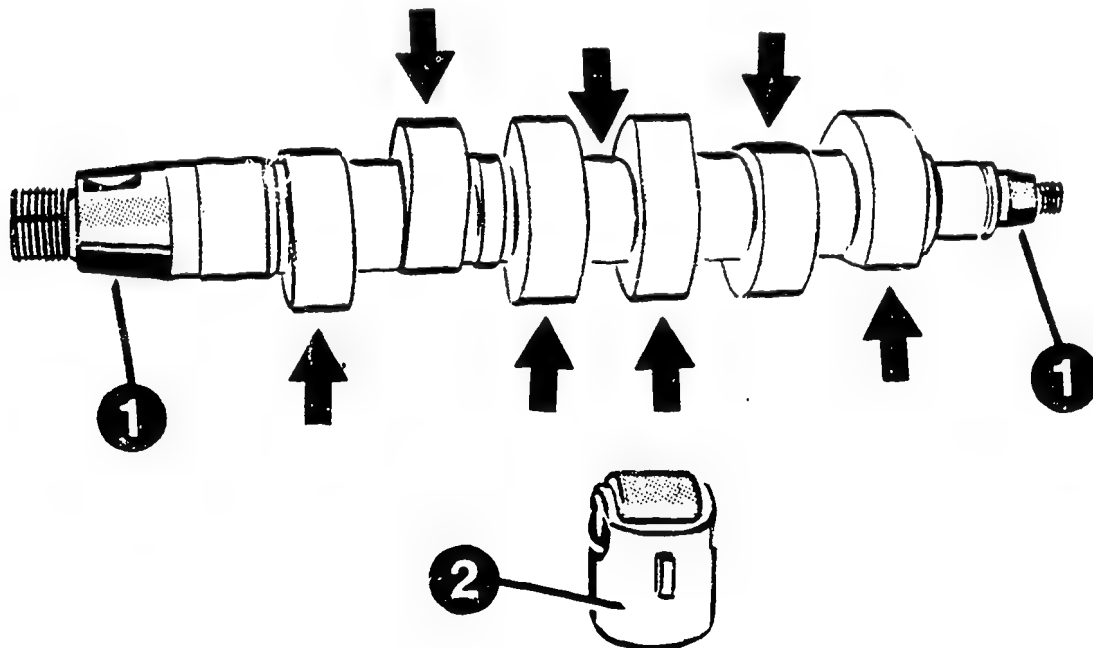
## CHECKING OF INDIVIDUAL COMPONENTS - WEAR ASSESSMENT

Renew the camshaft if it reveals pronounced running marks (arrows) or if a taper (1) is damaged. If the roller tappet (2) shows corresponding signs of wear, this is likewise to be replaced.

The replacement of roller tappets always results in the renewal of the camshaft.

Intermediate bearings which reveal running marks are to be replaced. If roller-tappet-shell seizure does not damage the camshaft, then it can be re-used.

Continue: D01/1 Fig.: C28/2

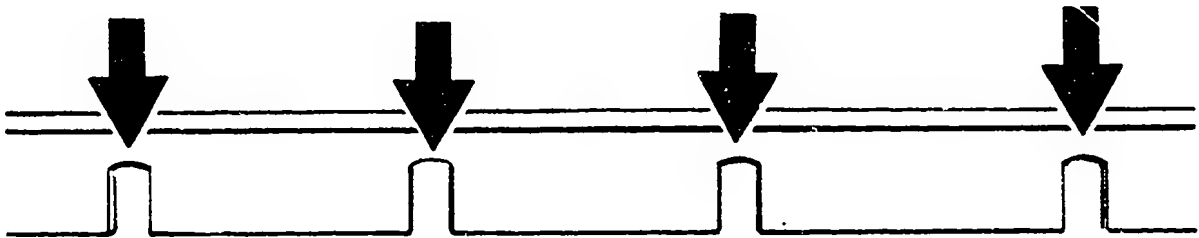


KMK 01257

CHECKING INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

Check control rod for worn grooves  
(arrows) as well as drive hubs of  
control sleeves for damage.

Continue: D02/1 Fig.: D01/2



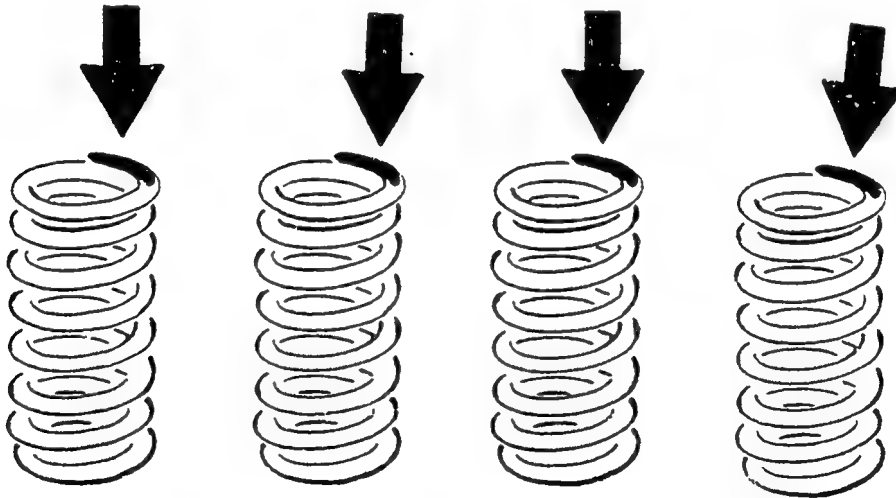
KMK 01258

CHECKING OF INDIVIDUAL COMPONENTS  
- WEAR ASSESSMENT

Corroded plunger springs, or plunger springs which exhibit surface damage, must be replaced due to the danger of fracture.

Pay particular attention to the area of the 1st winding seating surface (arrows).

Continue: D03/1 Fig.: D02/2



KMK 01259

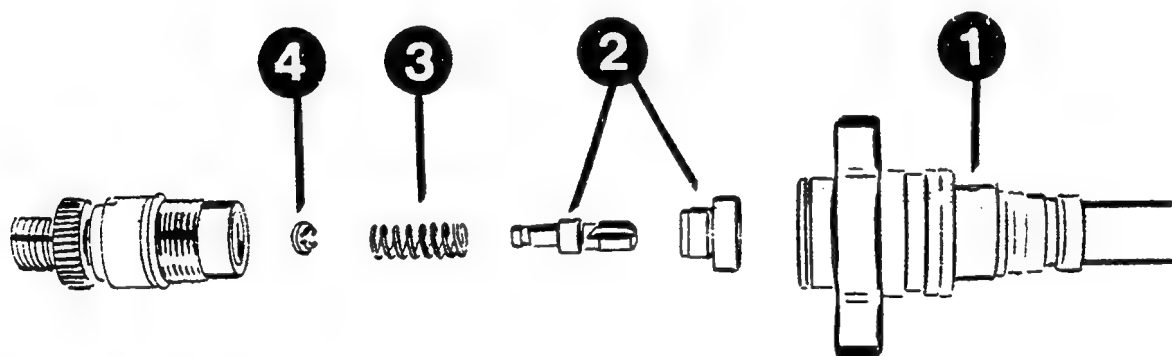
## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

Place pump barrel (1) in assembly device 0 986 611 356 (KDEP 2962). Insert constant-pressure valve (2) and valve spring (3) with spring seat or filler piece (4) in pump

Important !!!

- \* Install underside of delivery-valve assembly and support surface of delivery-valve assembly in pump barrel without the use of lubricant; wetting with fuel or calibrating oil is permitted.
- \* There is no seal between pump barrel and delivery-valve assembly on pumps of type P-8500.

Continue: D04/1 Fig.: D03/2



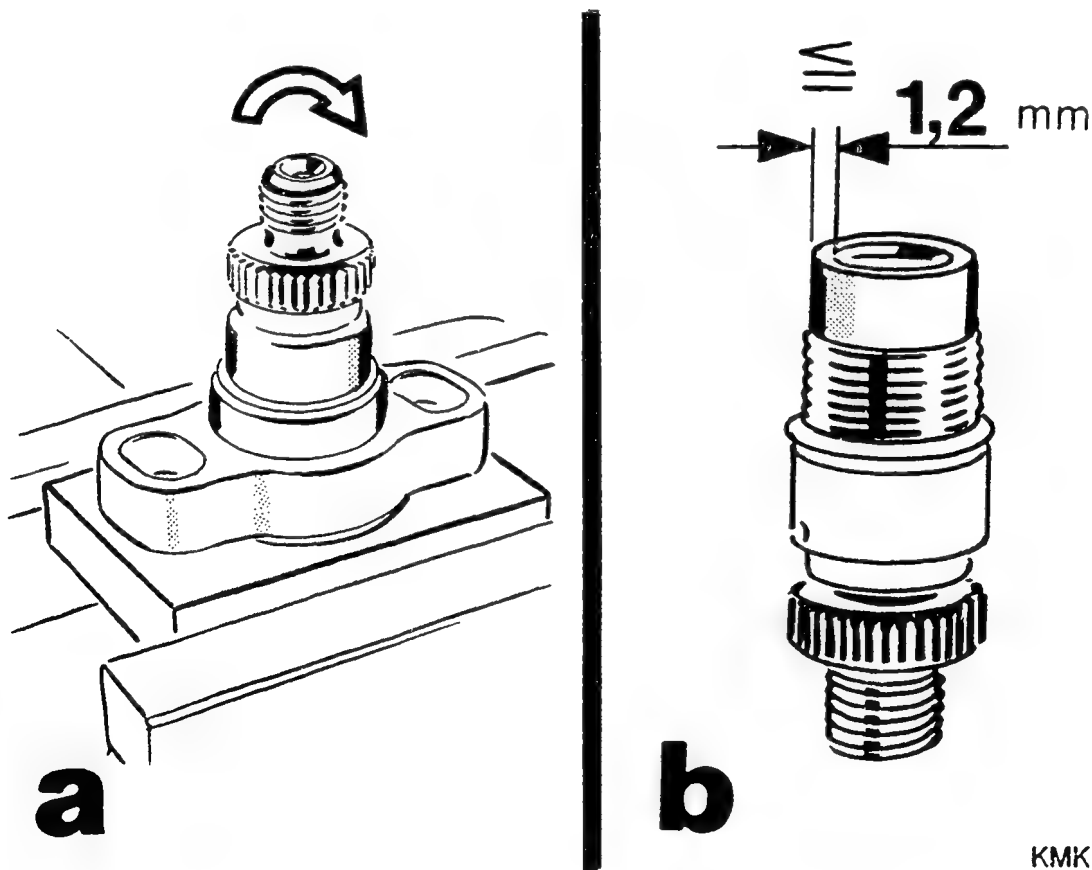
KMK 01260

## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

Provide delivery-valve holder with O-ring. Immerse thread in transmission oil as far as O-ring and screw in delivery-valve holder by hand. Pretighten delivery-valve holder with socket wrench 0 986 611 356 (KDEP 2962) to tightening torque of approx. 50 Nm. Then perform final tightening of delivery-valve holder in one operation to 110...120 Nm (picture a).

Note:  
Oblated gripping edge of delivery-valve holders already used must be  $< 1.2$  mm (picture b).

Continue: D05/1 Fig.: D04/2



KMK 01261

## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

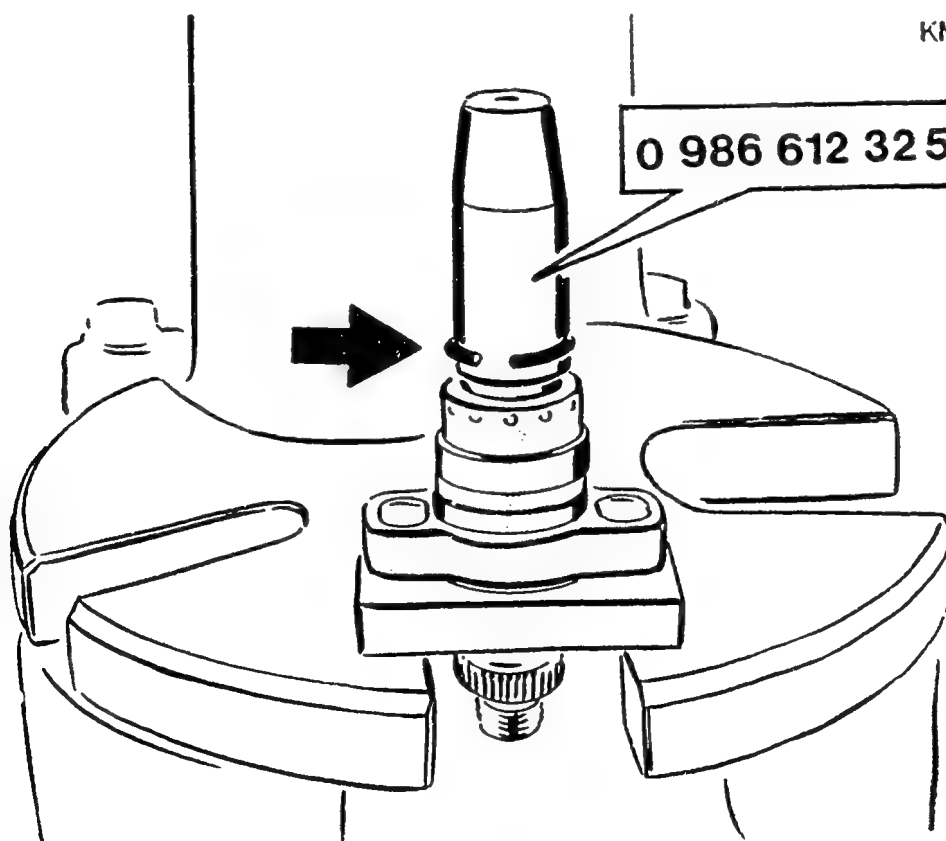
Turn pump barrel and place in assembly device 0 986 611 356 (KDEP 2962) again.

Attach impact cap to barrel.

Slip retainer of impact cap over inner part of assembly device 0 986 612 325 (KDEP 1714)

Attach inner part of assembly device 0 986 612 325 (KDEP 1714) to pump barrel.

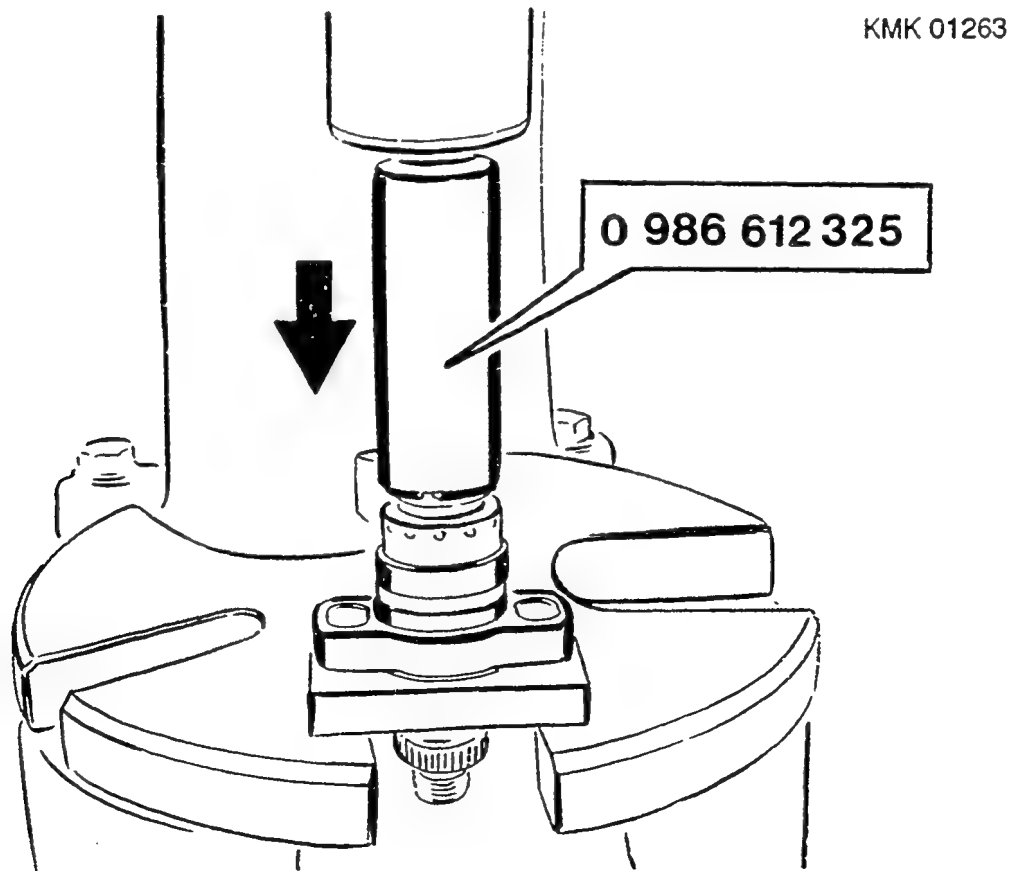
Continue: D06/1 Fig.: D05/2



## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

The outer part of the assembly device 0 986 612 325 (KDEP 1714) then pushes the retainer under the press onto the pump barrel (picture).

Continue: D07/1 Fig.: D06/2



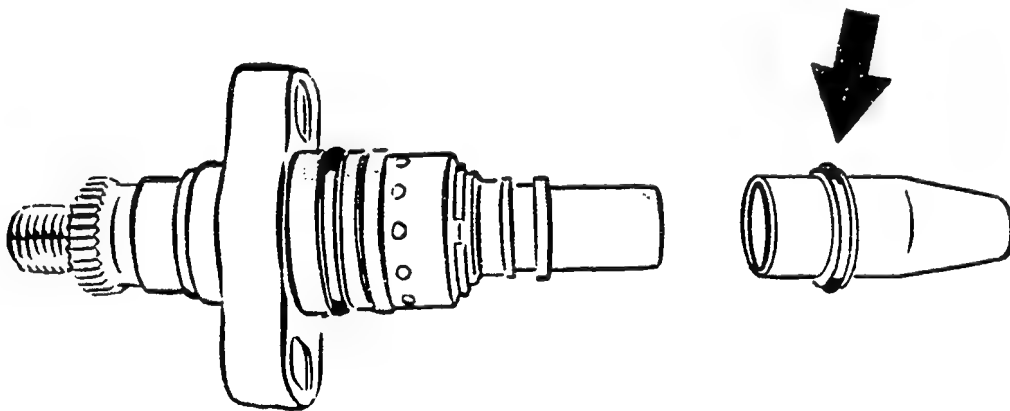
## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

Slip support ring/O-ring/support ring  
over inner part of assembly device  
0 986 612 495 (arrow).

Note:  
Openings in support rings must be  
offset.

Continue: D08/1 Fig.: D07/2

KMK 03652





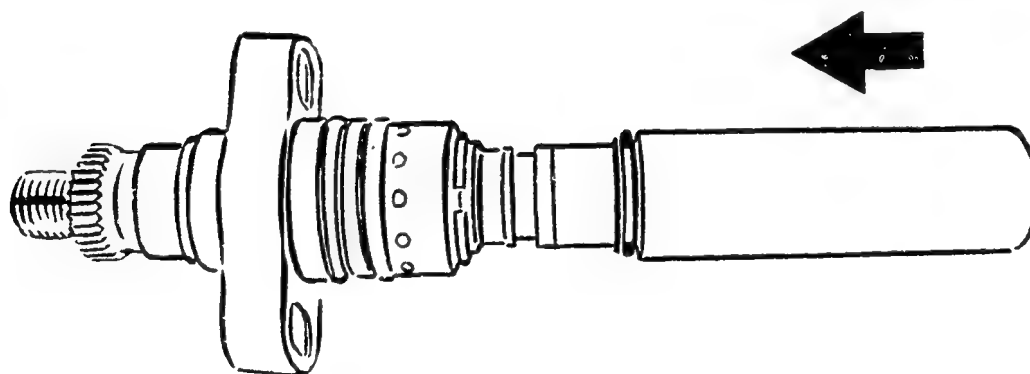
## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

Attach inner part to plunger-and-barrel assembly. Slip support ring/O-ring/support ring with outer part of assembly device 0 986 612 495 onto plunger-and-barrel assembly.

Remove assembly device.

Continue: D09/1 Fig.: D08/2

KMK 03653

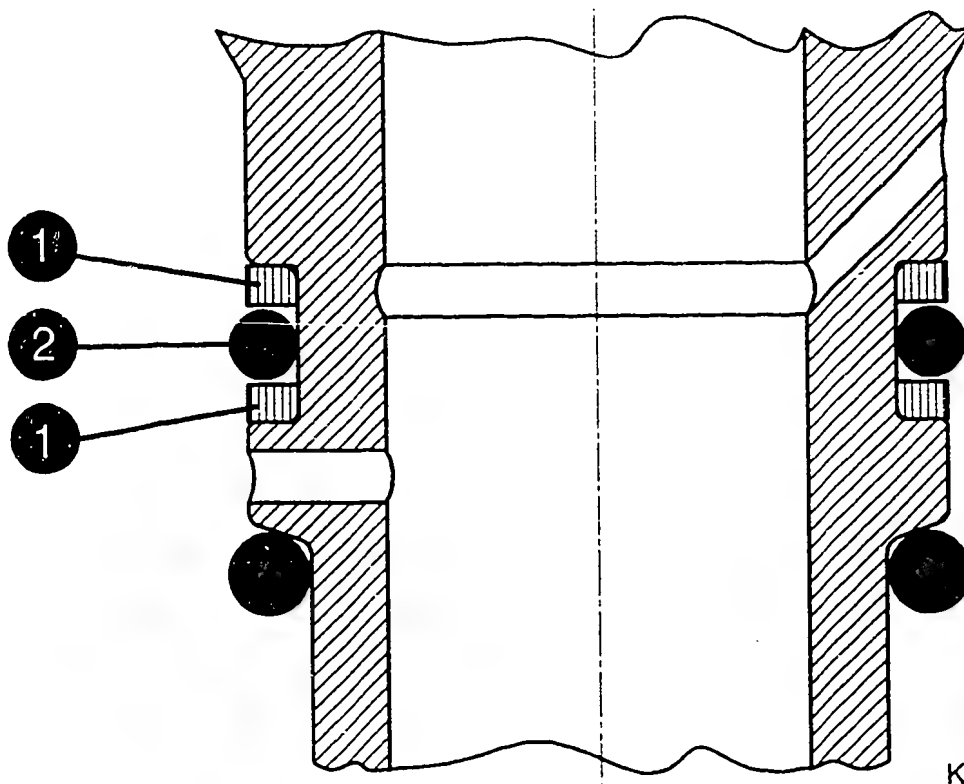


## ASSEMBLING BARREL-AND-VALVE ASSEMBLY

Check whether position of support ring (1)/O-ring (2)/support ring (1) is OK as shown in picture.

Note:  
Openings in support rings must be offset.

Continue: D10/1 Fig.: D09/2



KMK01264

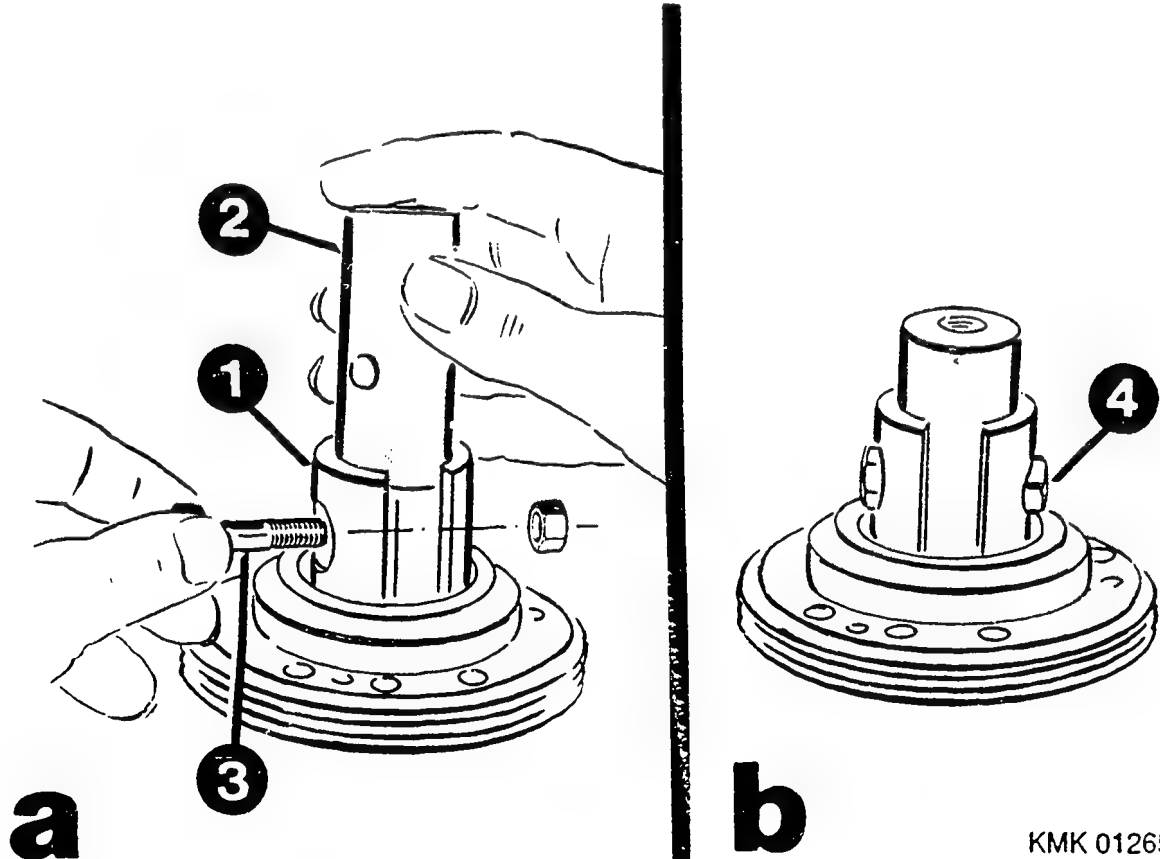
## REPLACING CAMSHAFT BEARING - BEARING END PLATE

Remove cylindrical rollers of bearing on drive end and insert both halves of puller (1) 0 986 612 111 (KDEP 1570) into bearing outer race.

The holding mandrel (2) is then inserted between the extractors such that the connecting screw (3) can be slipped through all three parts (picture a).

The fastening nut (4) is then screwed onto the connecting screw and tightened by hand (picture b).

Continue: D11/1 Fig.: D10/2

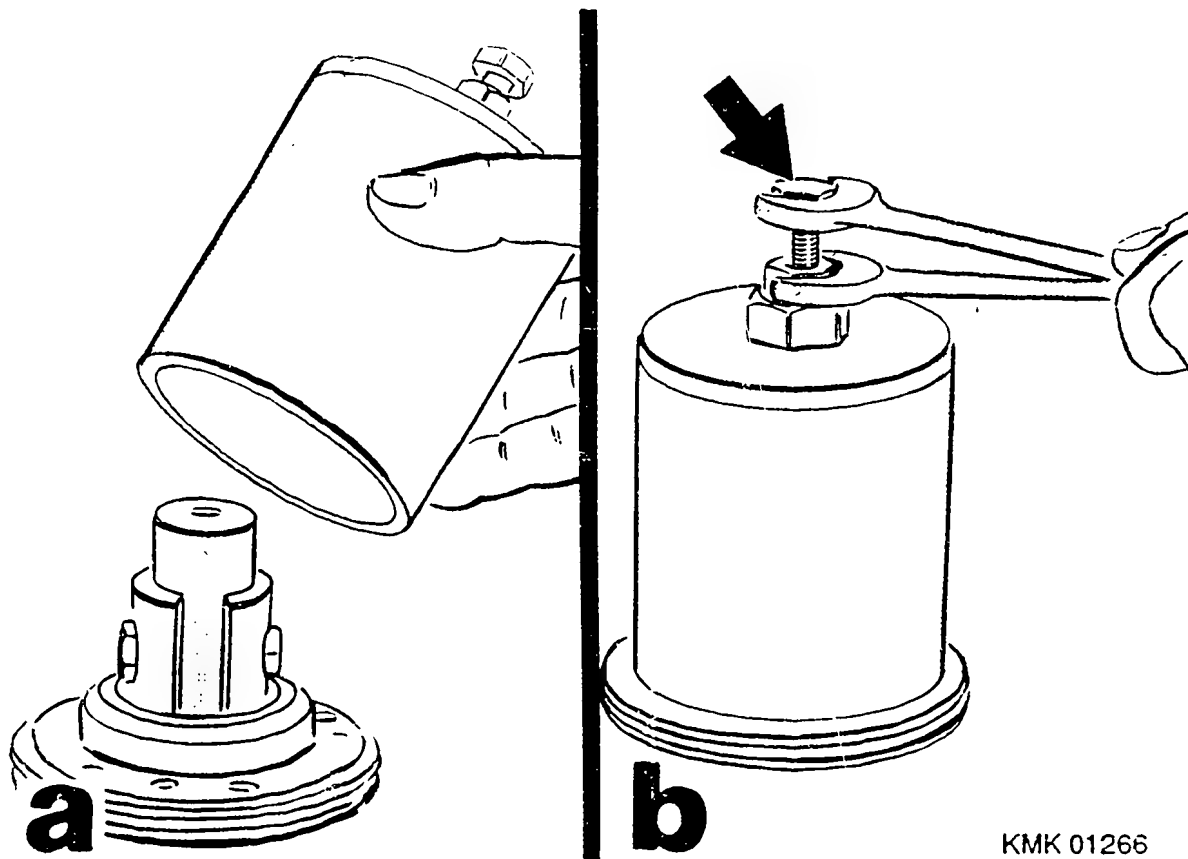


KMK 01265

## REPLACING CAMSHAFT BEARING - BEARING END PLATE

Place puller bell 0 986 612 108 (KDEP 1569/ 1) over fitted puller (picture a). Screw pressing-off screw into nut of puller (arrow) and pull bearing outer race out of bearing end plate with puller 0 986 612 111 (KDEP 1570) by turning nut with open-end wrench. Counterhold screw (picture b). The bearing outer race is destroyed. The complete bearing is to be scrapped and replaced with a new one.

Continue: D12/1 Fig.: D11/2



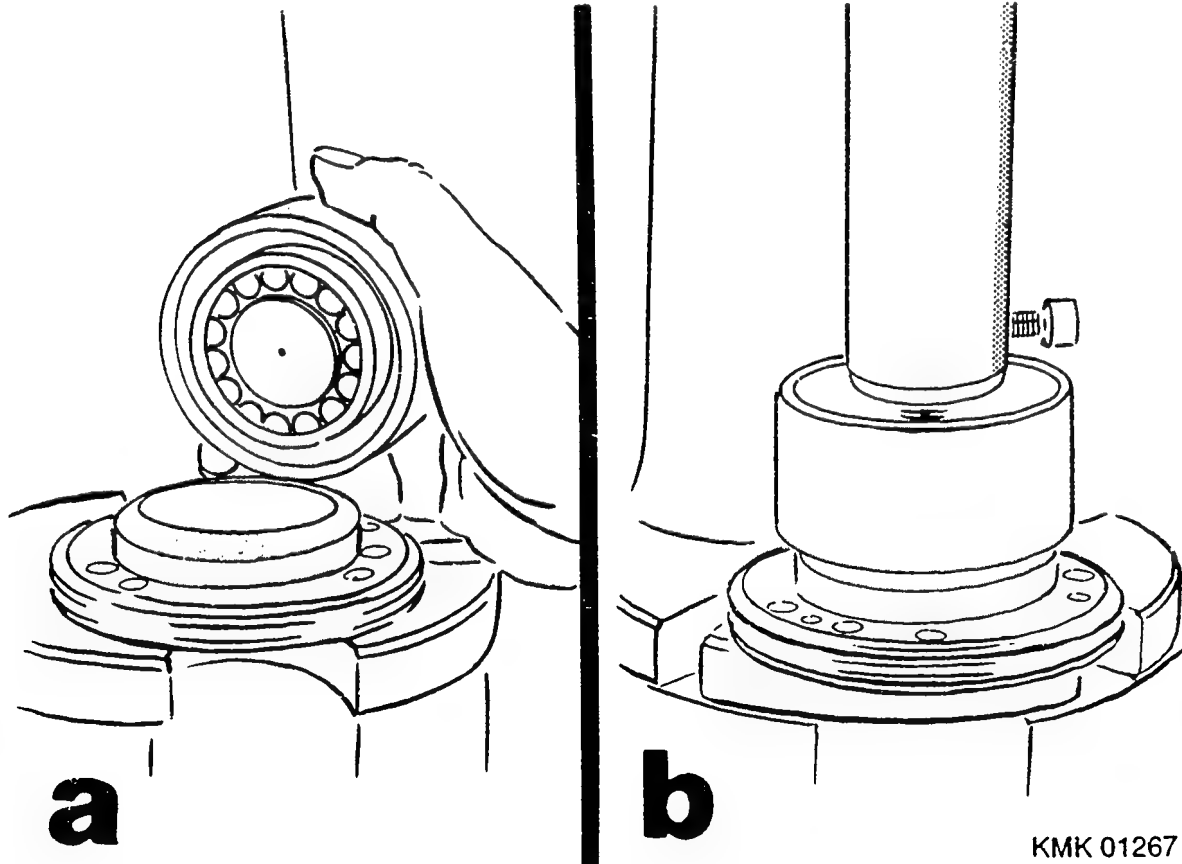
KMK 01266

REPLACING CAMSHAFT BEARING  
- BEARING END PLATE

Position cylindrical-roller bearing  
on mandrel of pressing-in tool  
0 986 612 494 for installation in  
drive-end bearing end plate  
(picture a).

Press cylindrical-roller bearing into  
corresponding mounting hole in bearing  
end plate as far as it will go  
(picture b).

Continue: D13/1 Fig.: D12/2



KMK 01267

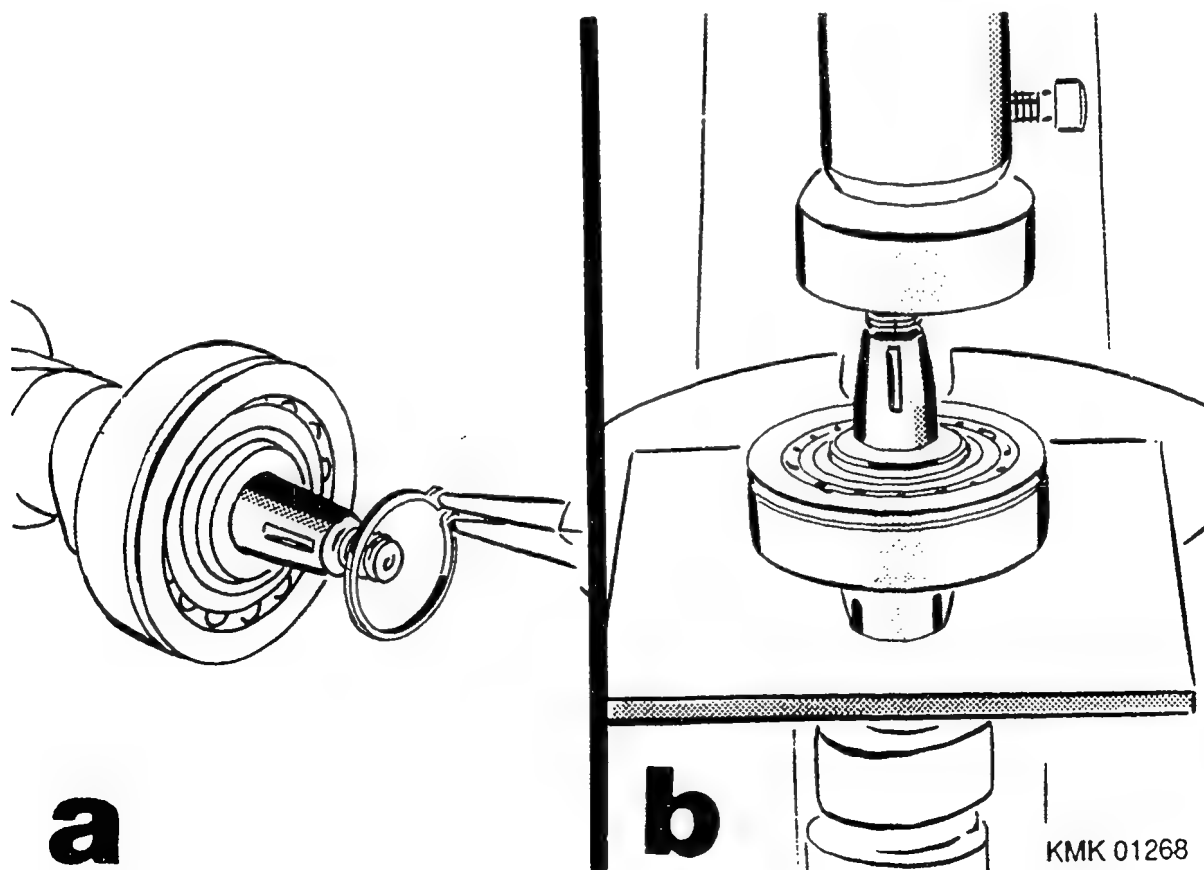
# REPLACING CAMSHAFT BEARING - SELF-ALIGNING ROLLER BEARING

Remove retainer from camshaft  
(picture a).

Press camshaft out of self-aligning  
roller bearing using pressing-off  
plate 0 986 612 134 (KDEP 1580)  
as shown in picture b.

The bearing is destroyed.  
Reuse is not permitted.

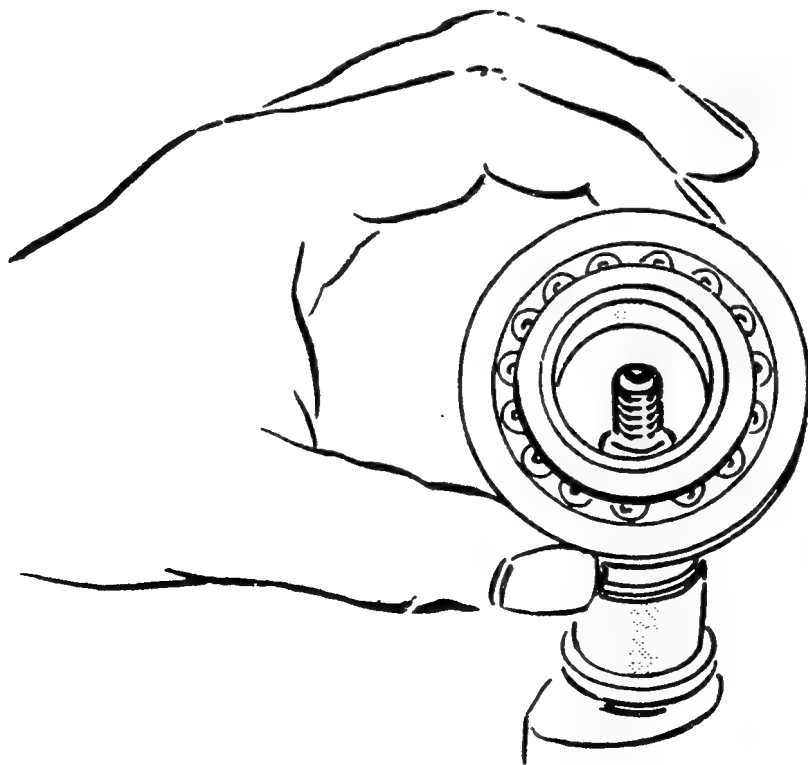
Continue: D14/1 Fig.: D13/2



REPLACING CAMSHAFT BEARING  
- SELF-ALIGNING ROLLER BEARING

Position camshaft perpendicularly and provisionally attach complete self-aligning roller bearing to camshaft.

Continue: D15/1 Fig.: D14/2



KMK 01269

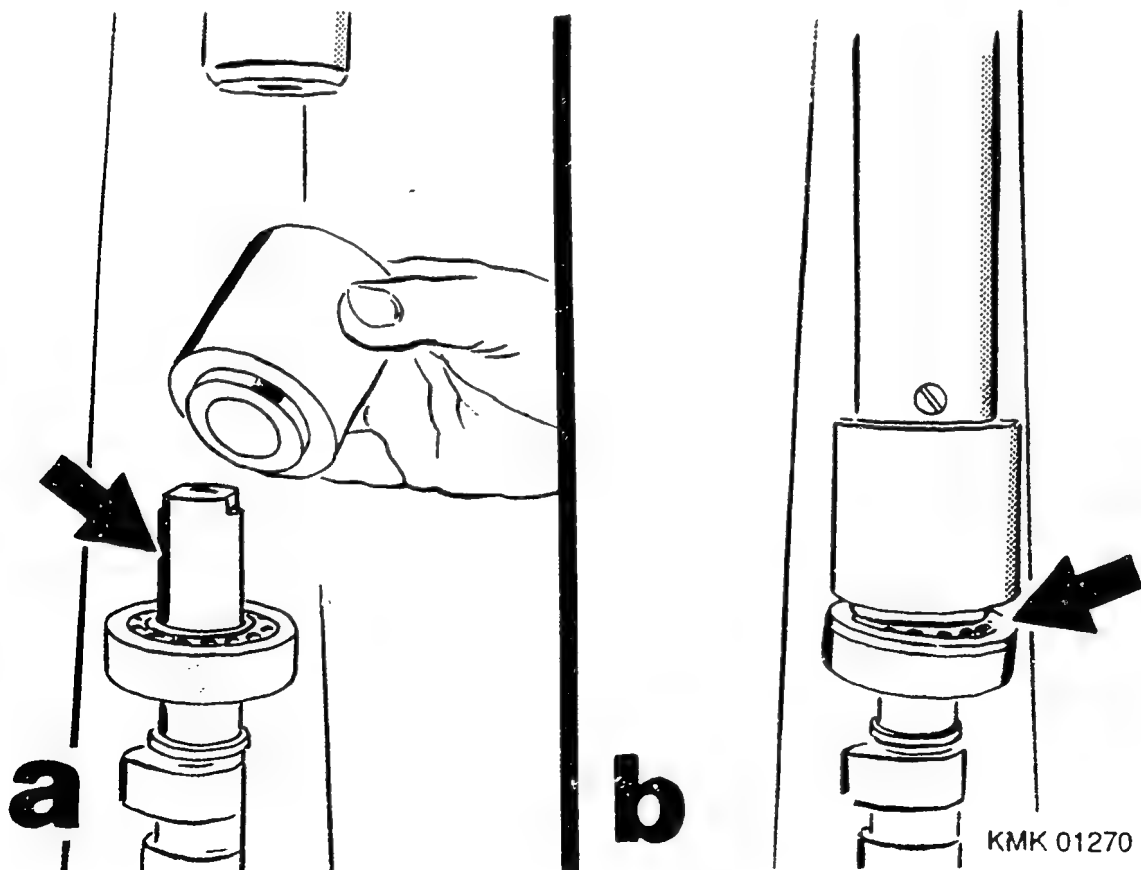
## REPLACING CAMSHAFT BEARING - SELF-ALIGNING ROLLER BEARING

Screw guide bushing 0 986 612 493  
(picture a - arrow) of pressing-in  
tool 0 986 612 065 (KDEP 1552)  
onto thread of camshaft.

Carefully attach sleeve of tool with  
machined shoulder to inner race of  
self-aligning roller bearing (picture  
b - arrow) and press bearing as far  
as it will go onto bearing seat of  
camshaft.

When installing bearing, care is to  
be taken to ensure that annular groove  
of bearing outer race is on outside.

Continue: D16/1 Fig.: D15/2

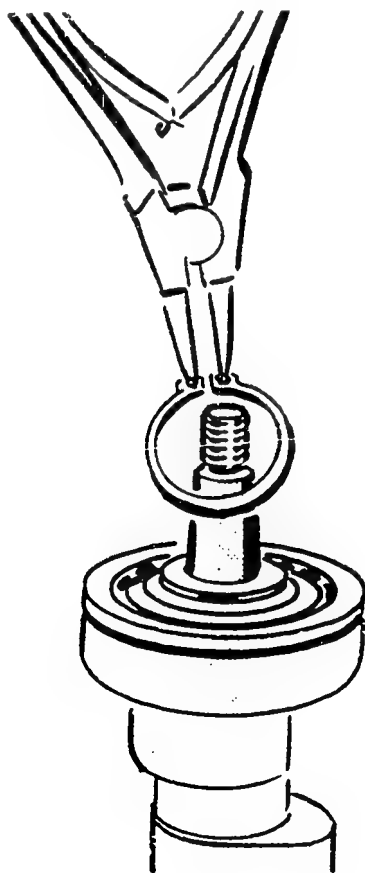




REPLACING CAMSHAFT BEARING  
- SELF-ALIGNING ROLLER BEARING

Fit shaft retaining ring.

Continue: D17/1 Fig.: D16/2

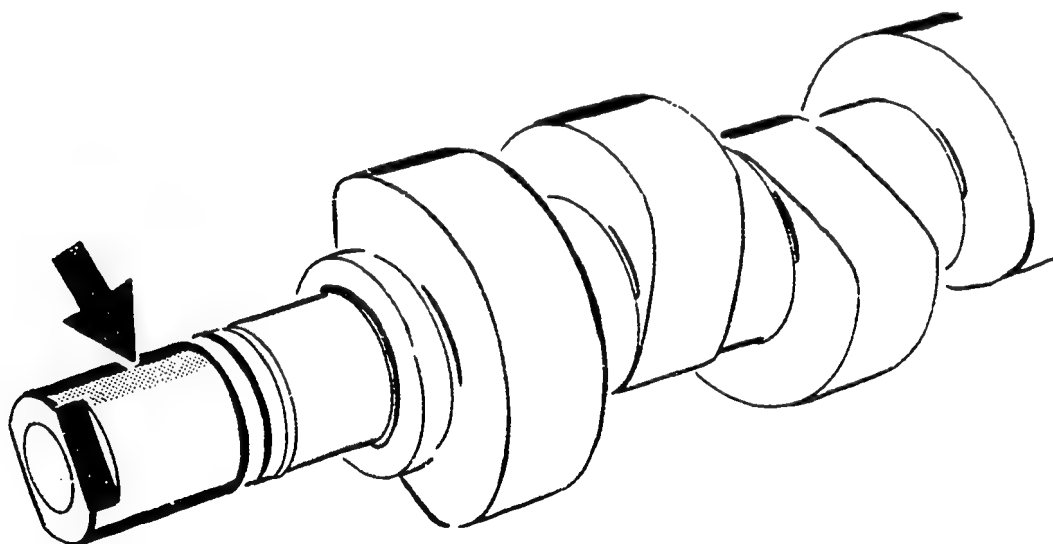


KMK 01271

REPLACING CAMSHAFT BEARING  
- CYLINDRICAL-ROLLER BEARING

Screw guide bushing 0 986 612 493  
(arrow) onto camshaft.

Continue: D18/1 Fig.: D17/2



KMK 01272

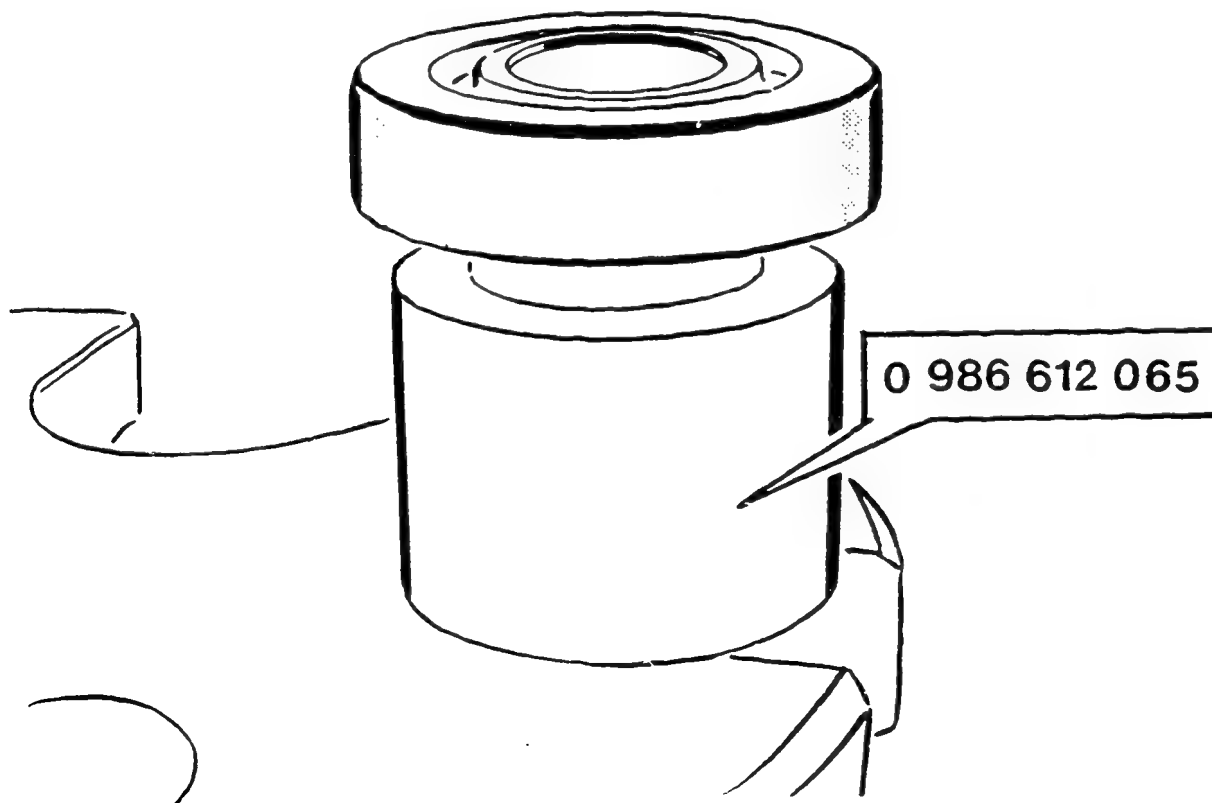
REPLACING CAMSHAFT BEARING  
- CYLINDRICAL-ROLLER BEARING

Position base body of 0 986 612 065  
(KDEP 1552) on press with shoulder  
upwards.

Place cylindrical-roller bearing on  
it with closed side up.

Continue: D19/1 Fig.: D18/2

KMK 01273



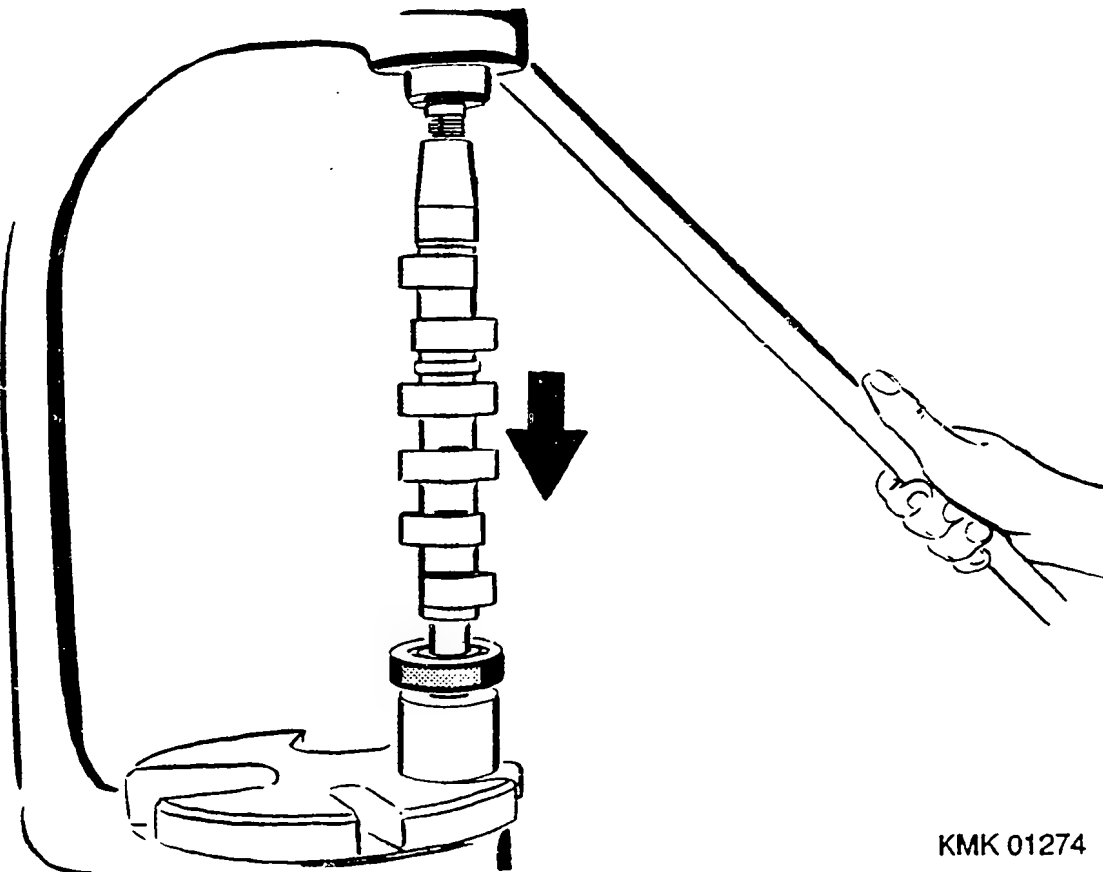
REPLACING CAMSHAFT BEARING  
- CYLINDRICAL-ROLLER BEARING

Insert camshaft with screwed-on  
guide nut through bearing inner race  
and base body of 0 986 611 735 (KDEP  
1069).

Press inner race onto camshaft as far  
as collar by uniformly turning spindle  
(d o n o t k n o c k!).

Unscrew guide bushing 0 986 612 493.

Continue: D20/1 Fig.: D19/2



## ASSEMBLY OF FUEL-INJECTION PUMP

Moisten pump plunger with calibrating oil prior to assembly.

Rub over O-rings with tallow.

Continue: D21/1

## FITTING BARREL-AND-FLANGE ELEMENTS

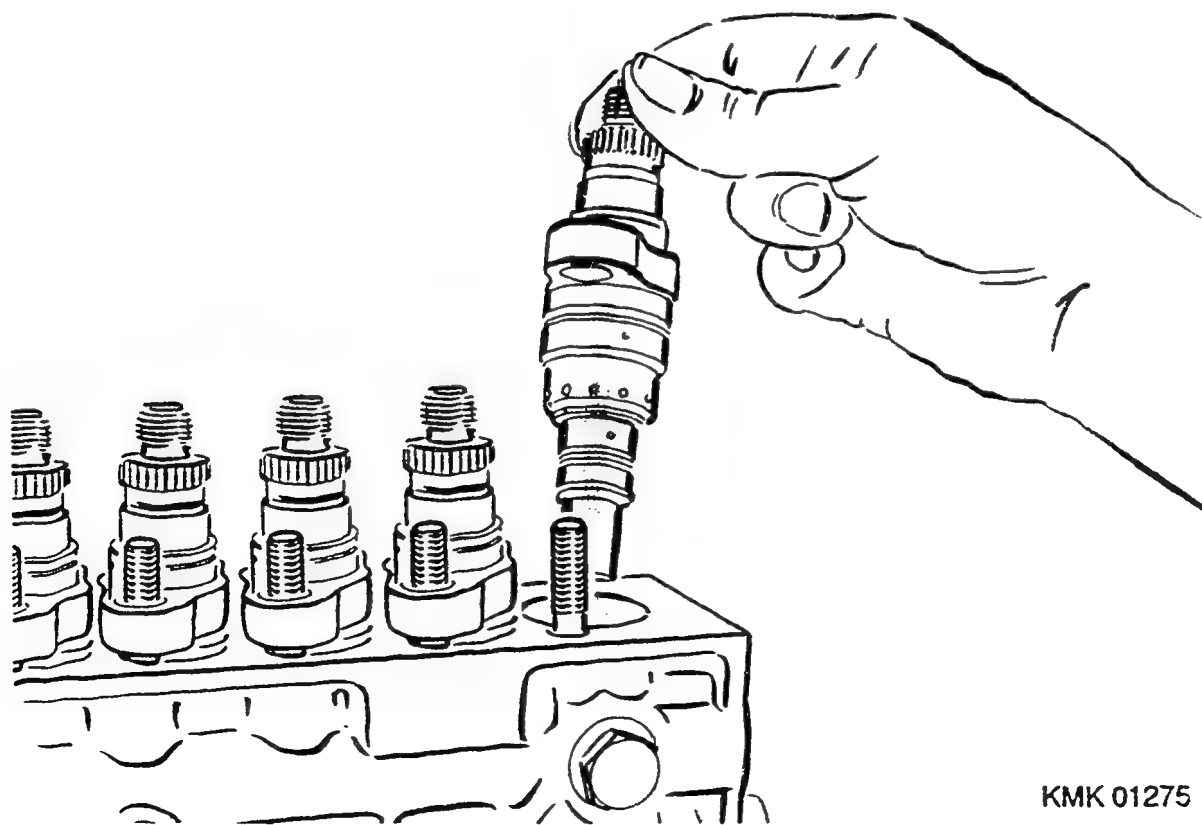
Insert barrel-and-flange element such that notch faces toward control rod (back of pump).

Do not force in barrel-and-valve assembly !!!

Screw on hexagon nut, but do not tighten it.

Turn barrel-and-valve assemblies such that stay bolts are in center of slots.

Continue: D22/1 Fig.: D21/2



KMK 01275

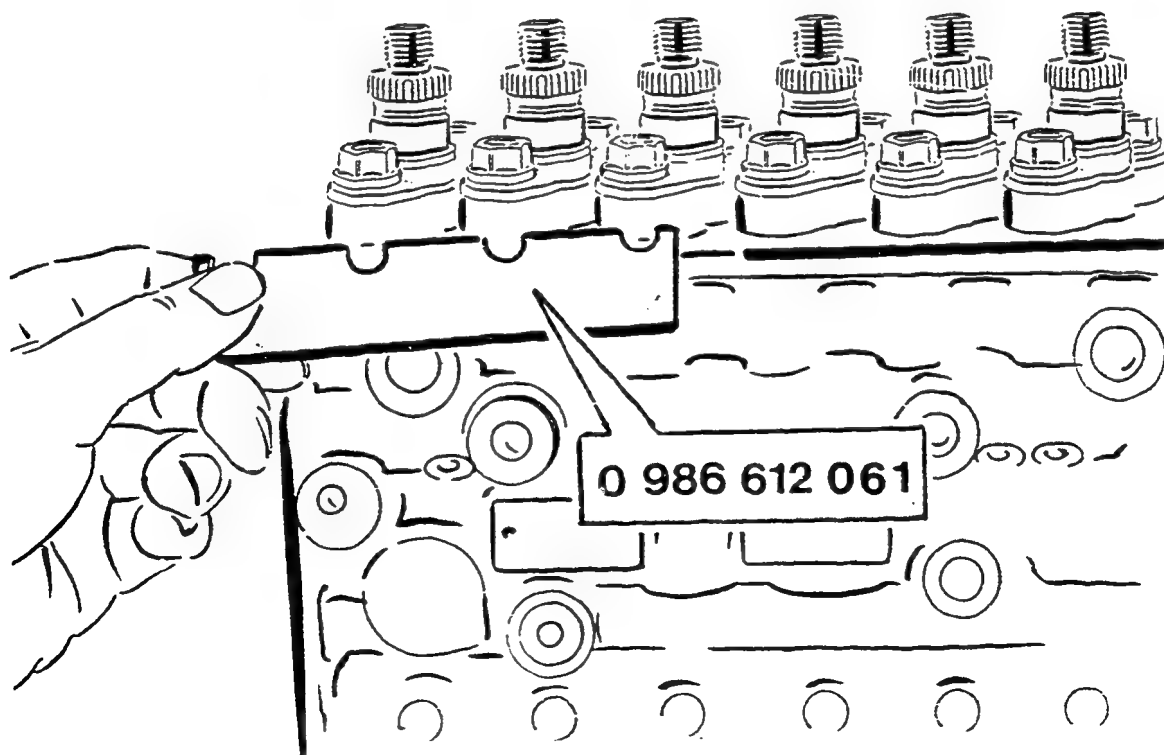
## INSTALLING BARREL-AND-FLANGE ELEMENTS

Raise barrel-and-flange elements such that spacers 0 986 612 061 (KDEP 1550) can be inserted beneath flanges.

Tighten fastening nut by hand such that spacers beneath flanges cannot drop out.

Continue: D23/1 Fig.: D22/2

KMK 01276



## CHECKING SUCTION GALLERY FOR LEAKS

Tilt pump. Moisten pump plunger with calibrating oil and insert into assembly cylinder.  
Pay attention to freedom of movement.

Insert retaining pin 0 986 612 114 (KDEP 1571) in setting hole.

Unscrew pump from clamping frame.

Connect up pump to compressed-air network via pressure reducer with water trap.

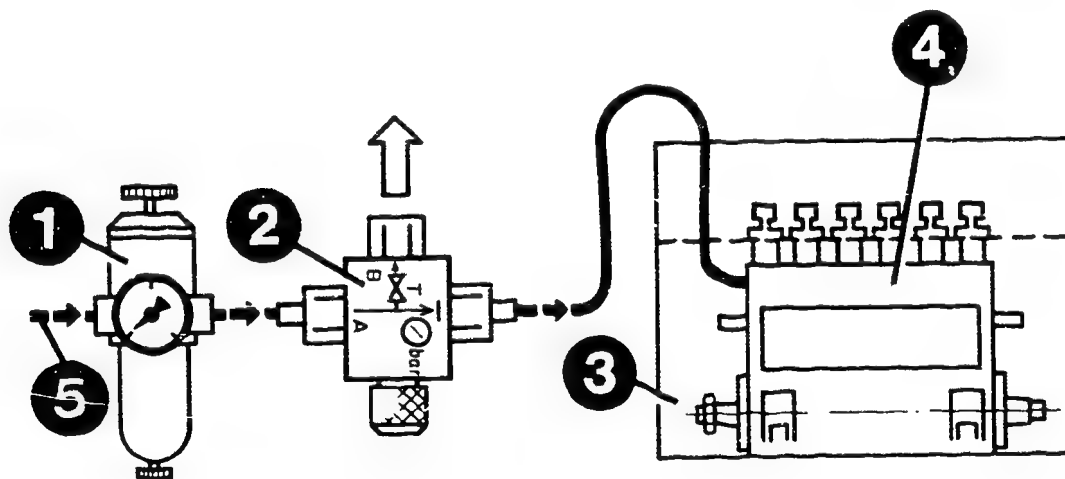
Continue: D24/1



## CHECKING SUCTION GALLERY FOR LEAKS

- 1 = Pressure reducer with press. gauge  
0 ... 6 bar and water trap
- 2 = Directional-control valve  
0 986 615 111 (KDJE-P 100/1.1)
- 3 = Immersion tank with calibrating oil
- 4 = Fuel-injection pump
- 5 = Direction of flow of compressed air

Continue: D25/1 Fig.: D24/2



KMK 01277

## CHECKING SUCTION GALLERY FOR LEAKS

Insert directional-control valve  
0 986 615 111 (KDJE-P 100/1.1) of pres-  
sure measuring device into compressed-  
air inlet to achieve prescribed pres-  
sure reduction during leak test

For test purposes, immerse pump per-  
pendicularly in test bath.

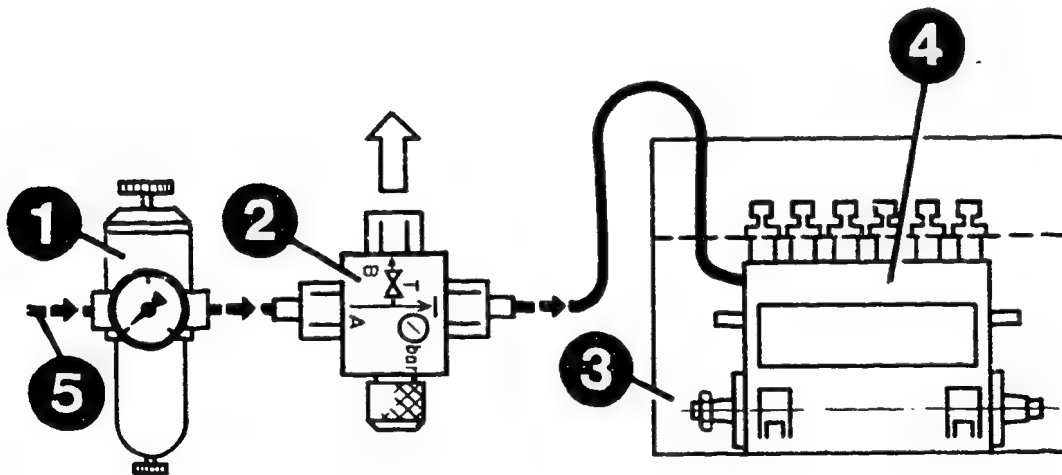
Calibrating oil must not be allowed  
to flood over the openings in the  
delivery-valve holders.

Continue: D26/1

## CHECKING SUCTION GALLERY FOR LEAKS

- 1 = Pressure reducer with press. gauge  
0 ... 6 bar and water trap
- 2 = Directional-control valve  
0 986 615 111 (KDJE-P 100/1.1)
- 3 = Immersion tank with calibrating  
oil
- 4 = Fuel-injection pump
- 5 = Direction of flow of compressed  
air

Continue: D27/1 Fig.: D26/2



KMK 01277

## SUCTION-GALLERY LEAK TEST

Swivel pump only to localize a possible leak.

Test duration and test pressure:

8 minutes at 5 bar

then 1 minute pulsating 0 ... 5 bar

Leakages in the area of the suction gallery are not permitted.

Pay particular attention to freedom from leaks of assembly seats.

Leaks between assembly cylinder and plunger are an exception.

Continue: D27/2

## SUCTION-GALLERY LEAK TEST

Remove pump from test bath and attach to clamping support.

Remove retaining pins.

Pull pump plunger out of barrel-and-valve assembly.

Note:

To avoid possible skin irritation, apply protective cream to hands before commencing test and wash hands in soap and water upon completion of testing. Use rubber gloves where possible.

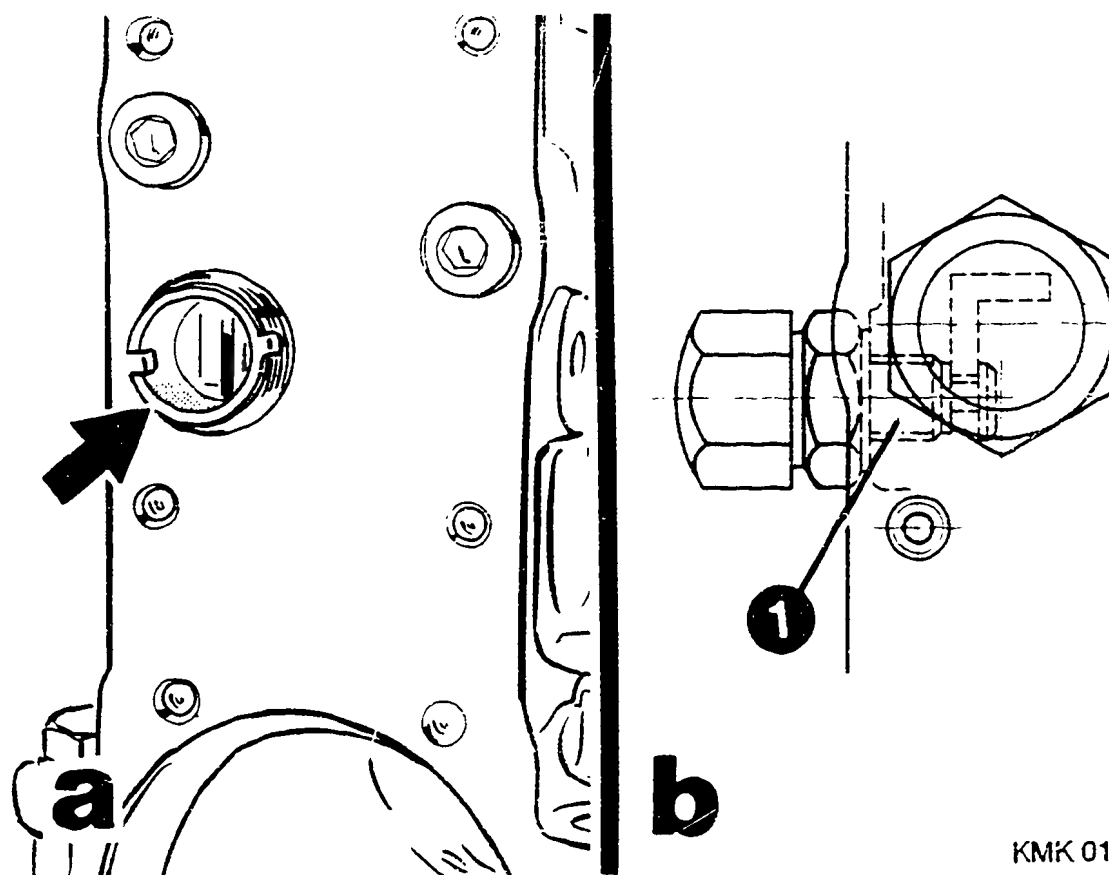
Continue: D28/1

## INSTALLING CONTROL ROD (RE POSITIONER)

Screw in threaded ring (picture a - arrow) with pin-type socket wrench 0 986 612 129 (KDEP 1577) and tighten to 30...40 Nm.

Screw control-rod guide screw into pump housing (picture b, item 1).

Continue: E01/1 Fig.: D28/2



KMK 01278

## INSTALLING CONTROL ROD (RE POSITIONER)

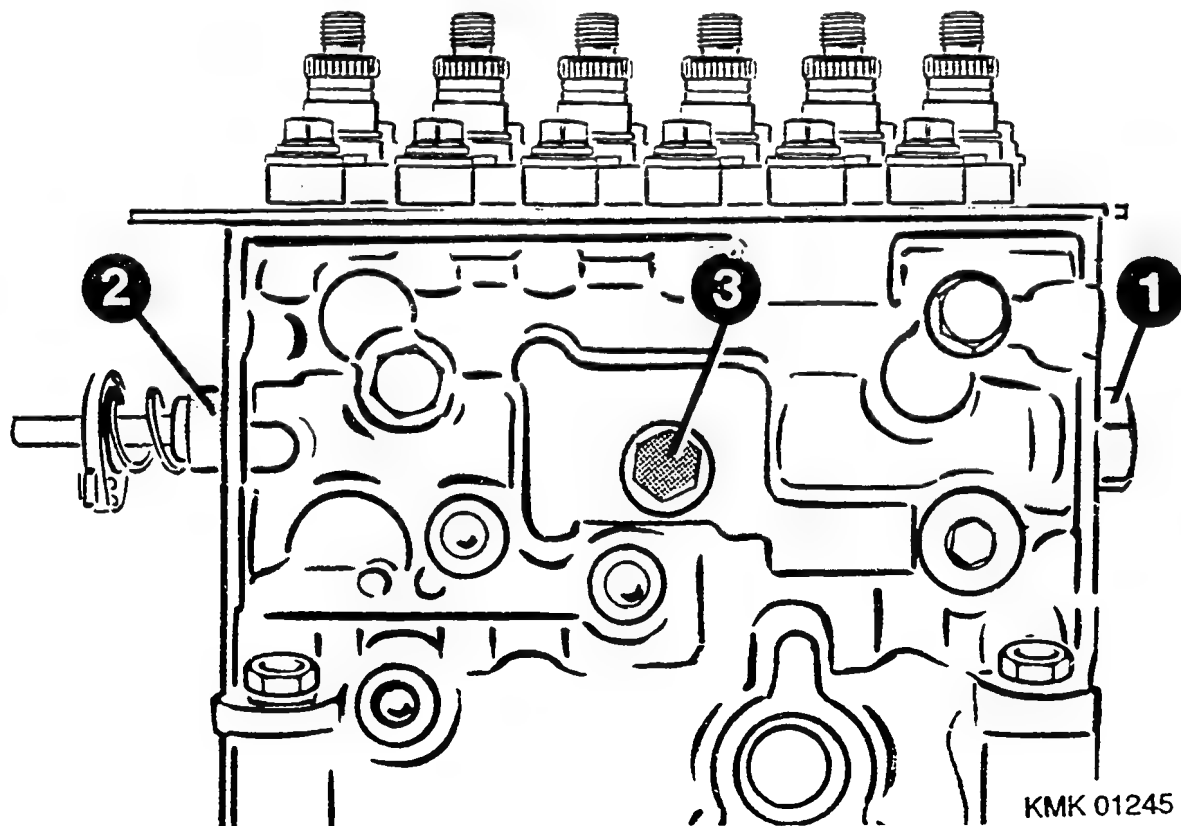
Insert control rod on governor end and tighten control-rod nut (2) to 30 ...40 Nm.

Screw in screw plug with seal ring (1) and tighten to 30 ... 40 Nm.  
Check whether control rod moves freely.

### Note:

Before checking freedom of movement of control rod, control-rod return spring must be initially tensioned with spring tensioner 0 986 612 311 (KDEP 1704) and thus made ineffective.

Continue: E02/1 Fig.: E01/2



## INSTALLING CONTROL ROD (MECH. GOVERNOR)

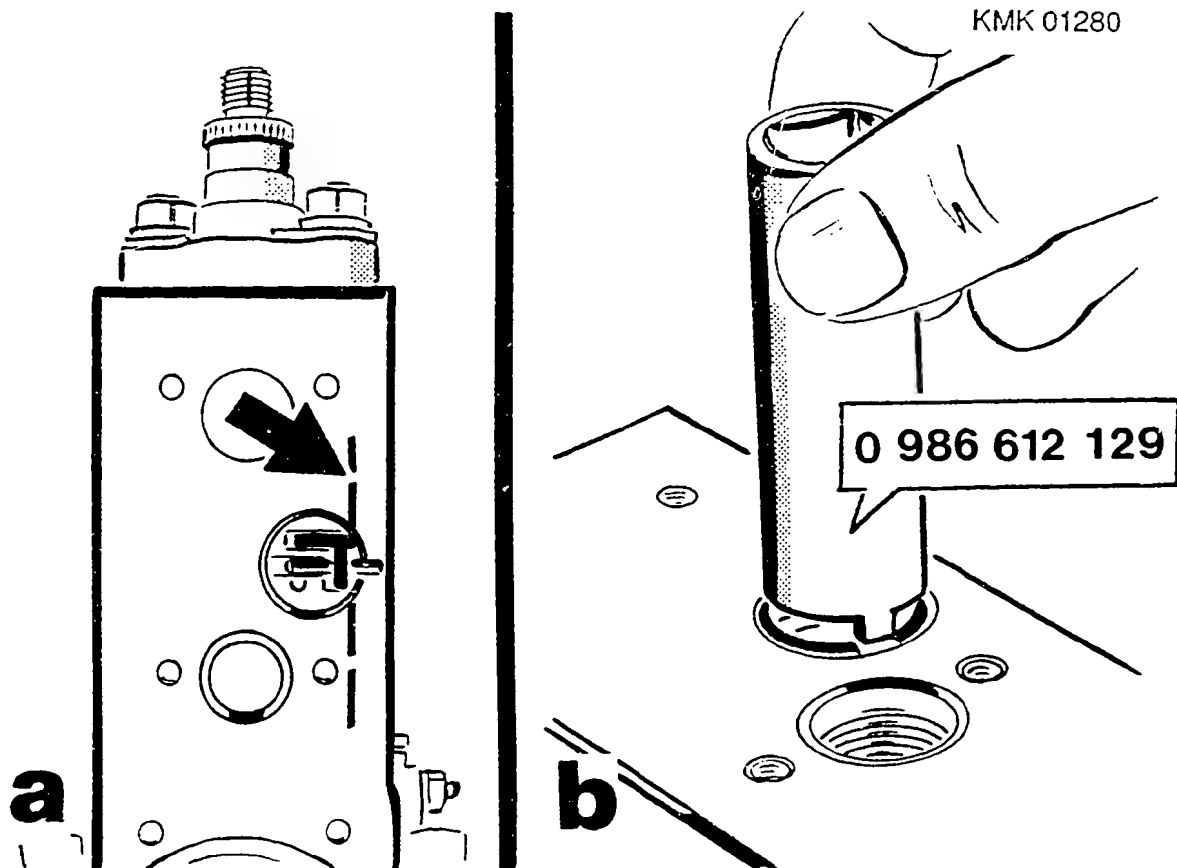
Press in new guide bushing (where required) on governor end with suitable sleeve such that perpendicular guide groove in guide bushing is in parallel with pump housing (picture a).

Insert control rod.

Insert straight pin in guide bushing.

Screw in threaded ring with pin-type socket wrench 0 986 612 129 (KDEP 1577) and tighten to 30 ... 40 Nm (picture b).

Continue: E03/1 Fig.: E02/2



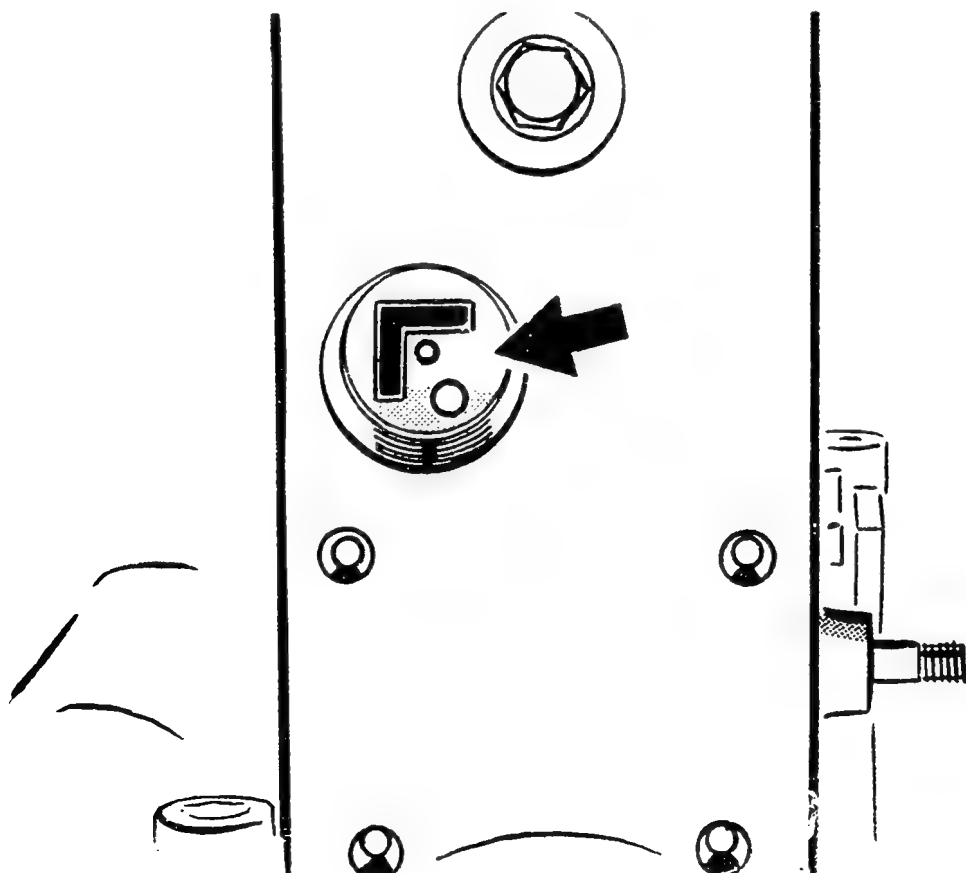
## INSTALLING CONTROL ROD (MECHANICAL GOVERNOR)

Insert guide bushing (arrow) over guide rod into housing on drive end (guide bushing does not have interference fit).

Screw in plug with sealing ring and tighten to 30 ... 40 Nm.

Check whether control rod moves freely.

Continue: E04/1 Fig.: E03/2



KMK 01281

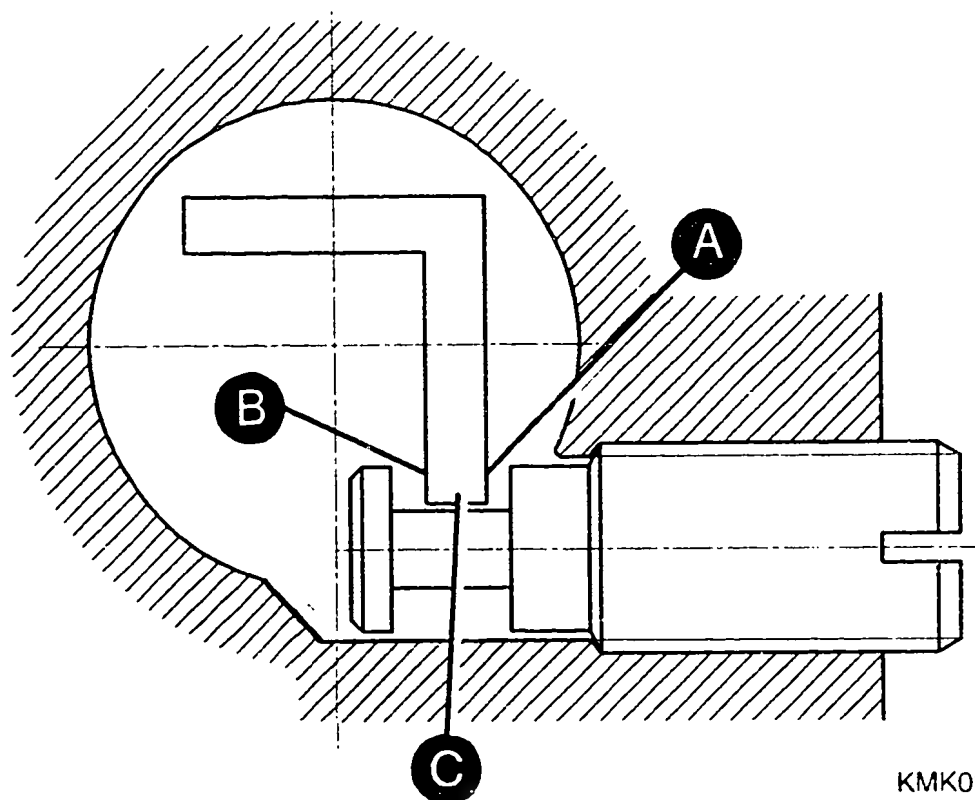


## INSTALLING CONTROL ROD

Screw in the guide screw by hand until control rod is contacted at point A.  
Screw out guide screw as far as contact point B.  
Screw guide screw back in again by half the distance screwed back (point C).

Tighten lock nut and cap of control-rod guide screw.

Continue: E05/1 Fig.: E04/2



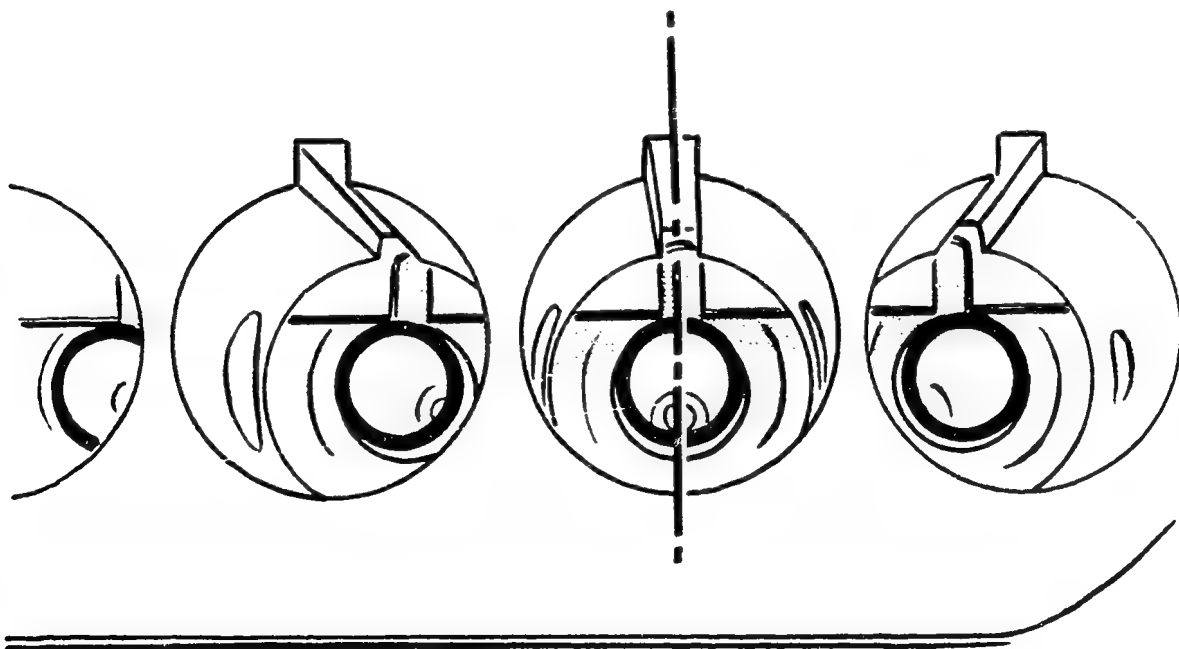
KMK01282

## INSERTING CONTROL SLEEVES

Move control rod to center position.

Drive-hub slots in control rod for control sleeve coincide with roller-tappet guides in pump housing.

Continue: E06/1 Fig.: E05/2



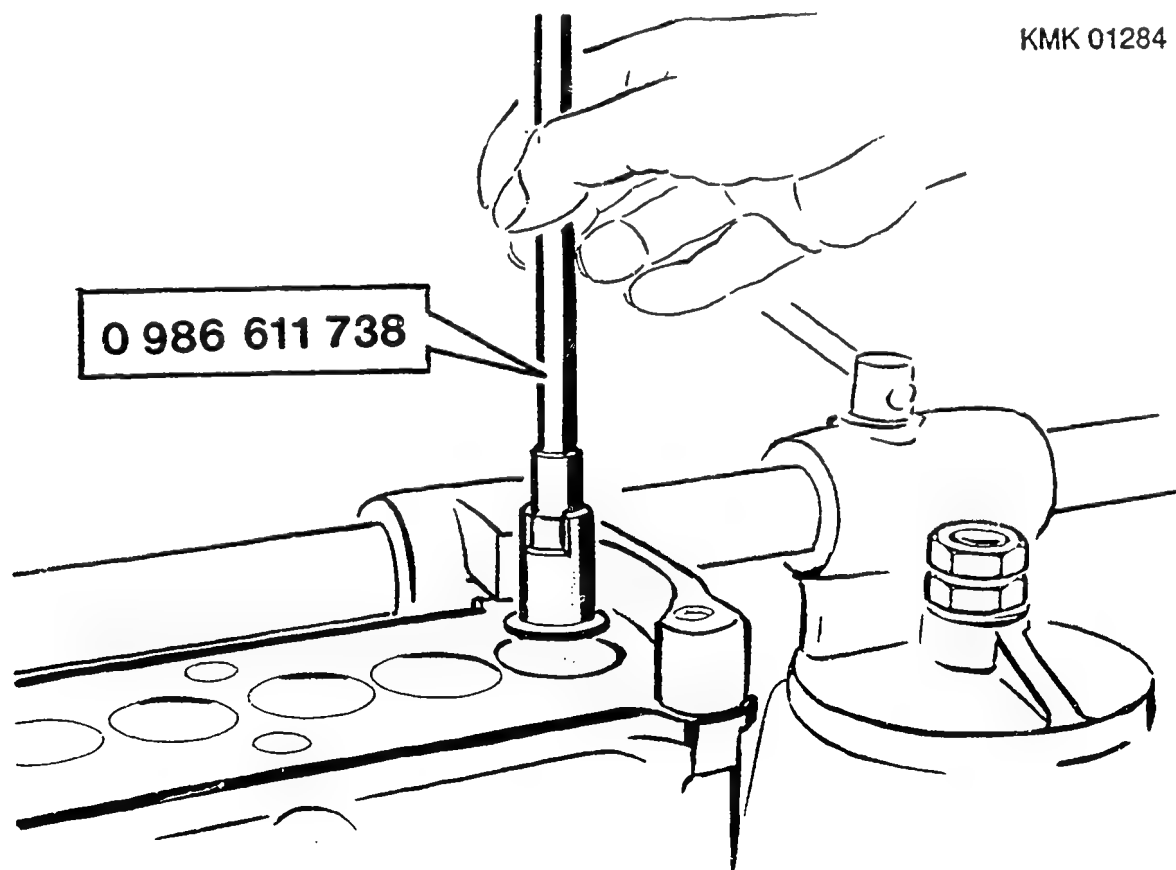
KMK 01283

## INSERTING CONTROL SLEEVES

Insert control sleeve with assembly tool 0 986 611 738 (KDEP 1071) such that the drive-hub balls of the control sleeves engage in drive-hub slots in control rod.

In doing so, constantly check control rod for freedom of movement.

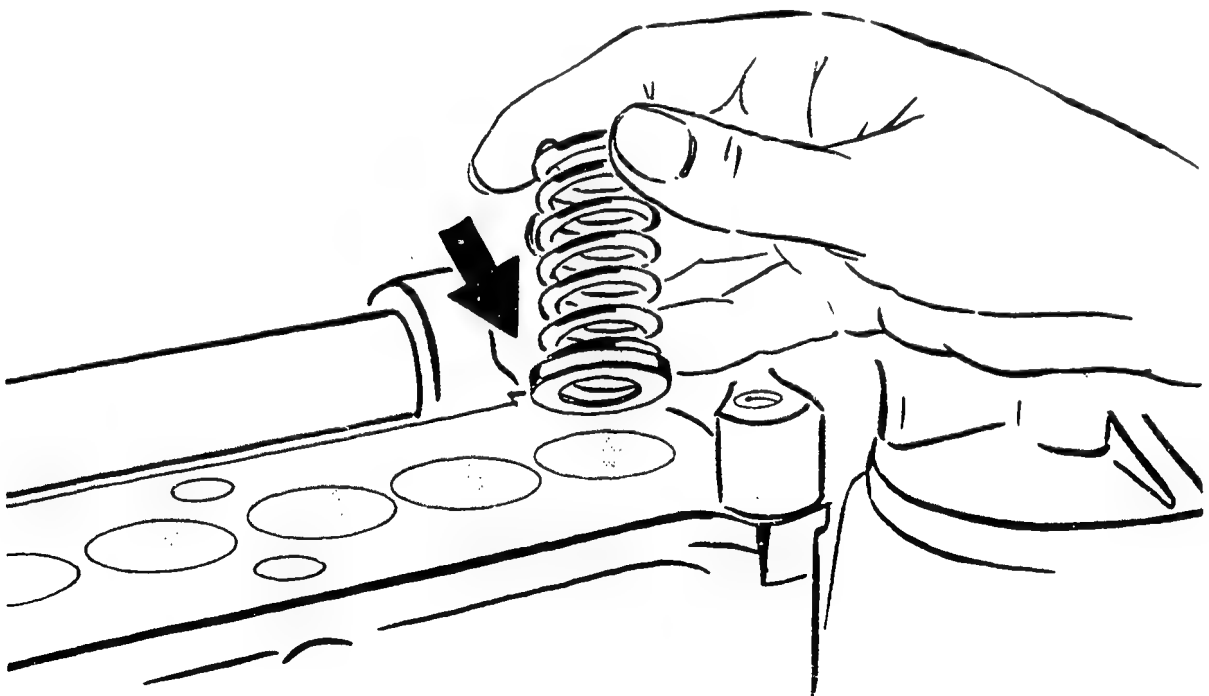
Continue: E07/1 Fig.: E06/2



## INSERTING COMPRESSION SPRING

Stick compression spring into upper  
spring seat with grease and insert  
into pump housing.

Continue: E08/1 Fig.: E07/2



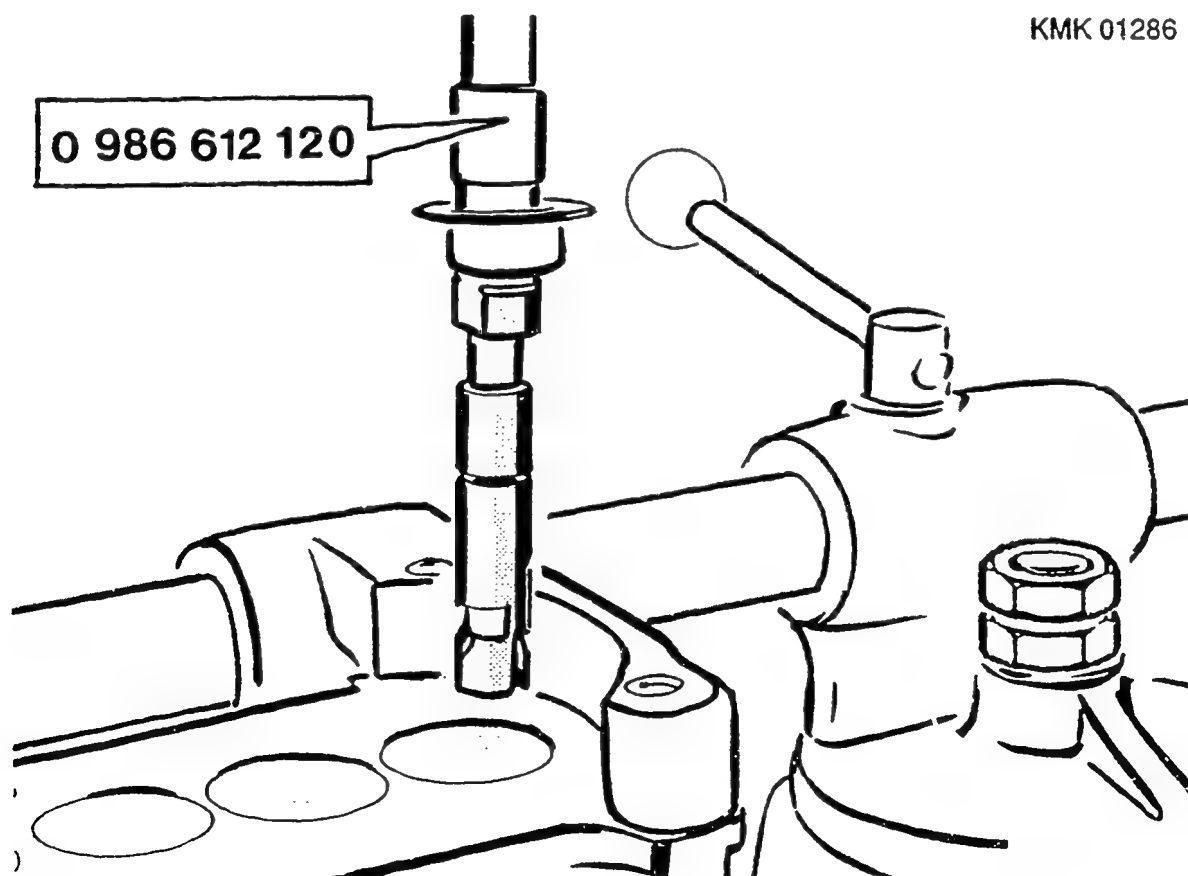
KMK 01285

## INSERTING PUMP PLUNGER

Slip lower spring seat onto base of pump plunger.

Insert pump plunger and spring seat in pump barrel with pliers 0 986 612 120 (KDEP 1575) such that mark on lug faces back of pump (control rod).

Continue: E09/1 Fig.: E08/2



## FITTING ROLLER TAPPET

### Safety measure:

The procedure outlined in the Section "FITTING ROLLER TAPPET" must be performed with extreme care. When carrying out this operation, there is a possibility of sudden tappet-spring release and thus a DANGER OF INJURY !

Continue: E10/1

## INSTALLING ROLLER TAPPET

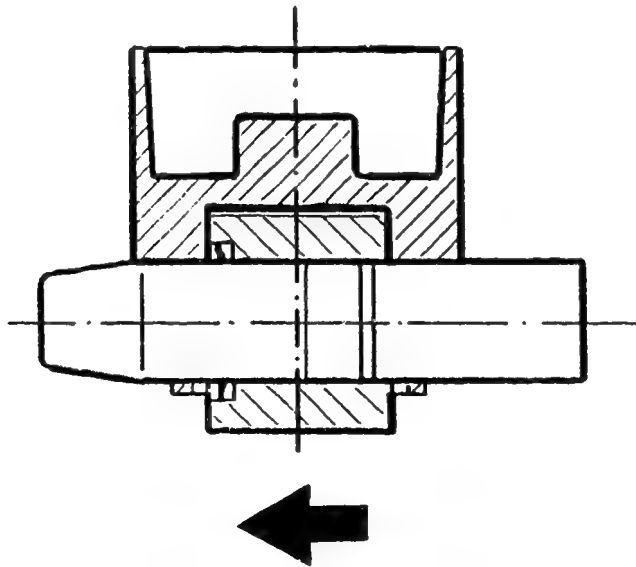
Insert retainer and tappet roller in roller-tappet shell.

On side opposite retainer insert centering mandrel C 986 642 492 tapered side first through hole.

Insert roller pin notch first through hole in same direction as centering mandrel.

Continue: E11/1 Fig.: E10/2

KMK 03654



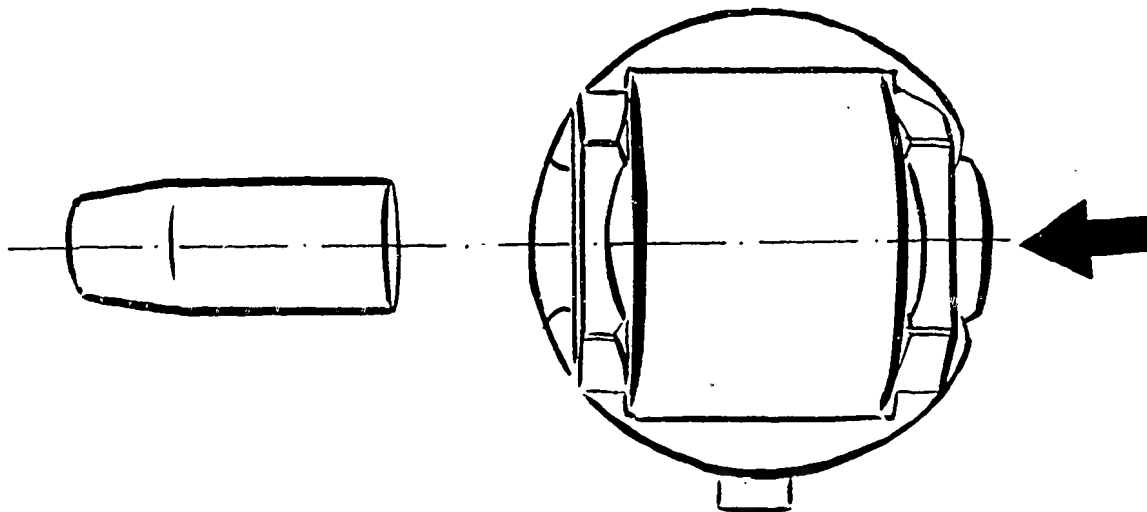
## INSTALLING ROLLER TAPPET

The procedure described pushes the centering mandrel through the roller pin out of the hole.

Press roller pin into hole until retainer is felt to engage in notch.

Continue: E12/1 Fig.: E11/2

KMK 03655

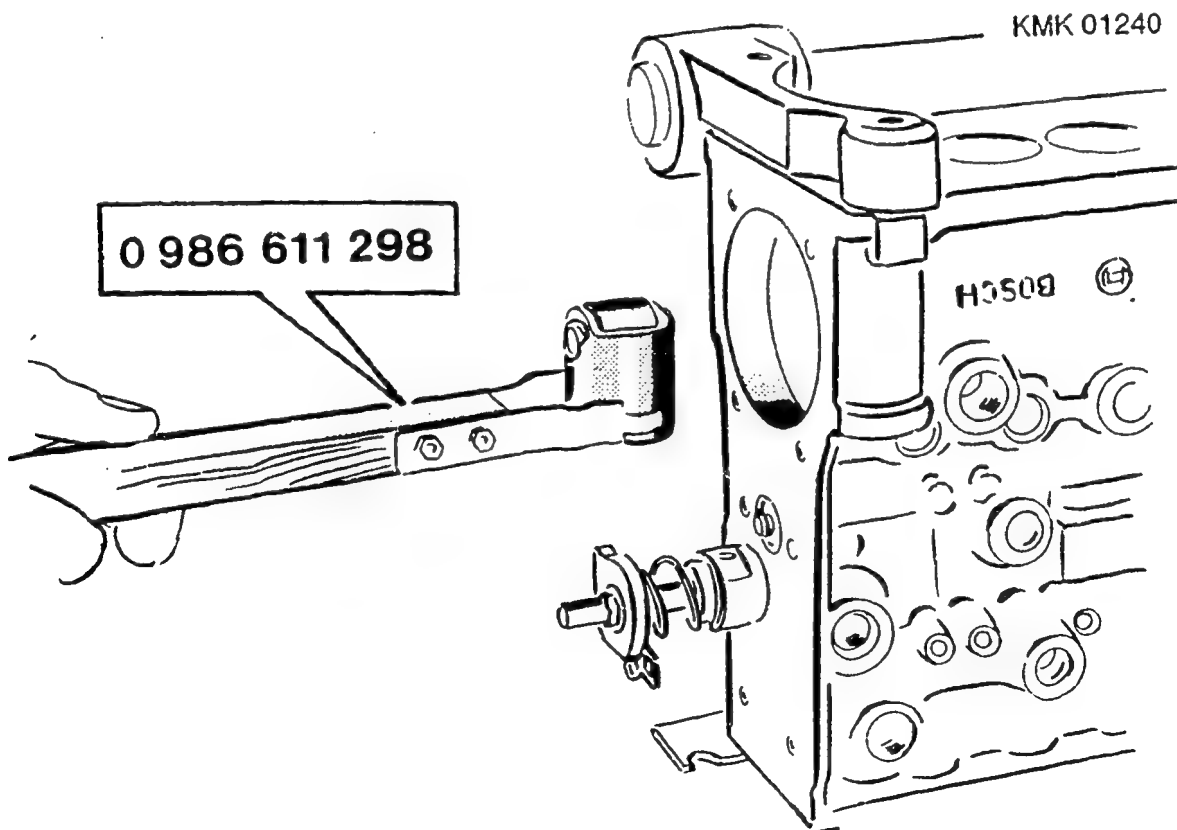




## INSTALLING ROLLER TAPPET

Clamp roller tappet in tappet forceps 0 986 611 298 (KDEP 2941) and insert through opening in bearing end plate into camshaft chamber such that position of sliding block for guiding roller tappet coincides with guide groove of roller tappet bore in pump housing.

Continue: E13/1 Fig.: E12/2

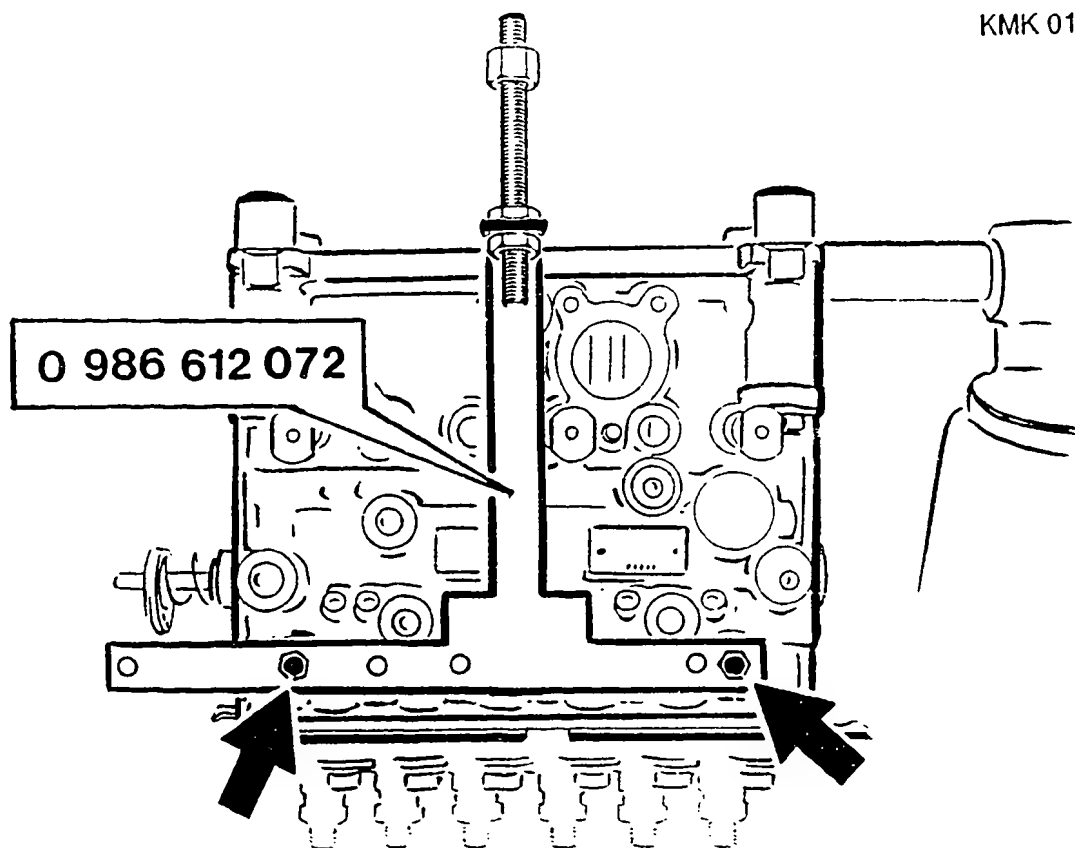


## INSTALLING ROLLER TAPPET

Attach assembly device 0 986 612 072 (KDEP 1556) to pump housing.

To do so, screw fastening screws (arrows) into tapped holes in fuel inlet/return and tighten.

Continue: E14/1 Fig.: E13/2



## INSTALLING ROLLER TAPPET

Attach tubular lever of assembly device 0 986 611 994 (KDEP 1505/0/1) to retaining pin of assembly device 0 986 612 072 (KDEP 1556).

Position thrust pin on roller of first roller tappet. Carefully press roller tappet into tappet hole in housing until tappet holder 0 986 612 482 can be inserted such that it makes contact with housing.

Continue: E15/1

## INSTALLING ROLLER TAPPET

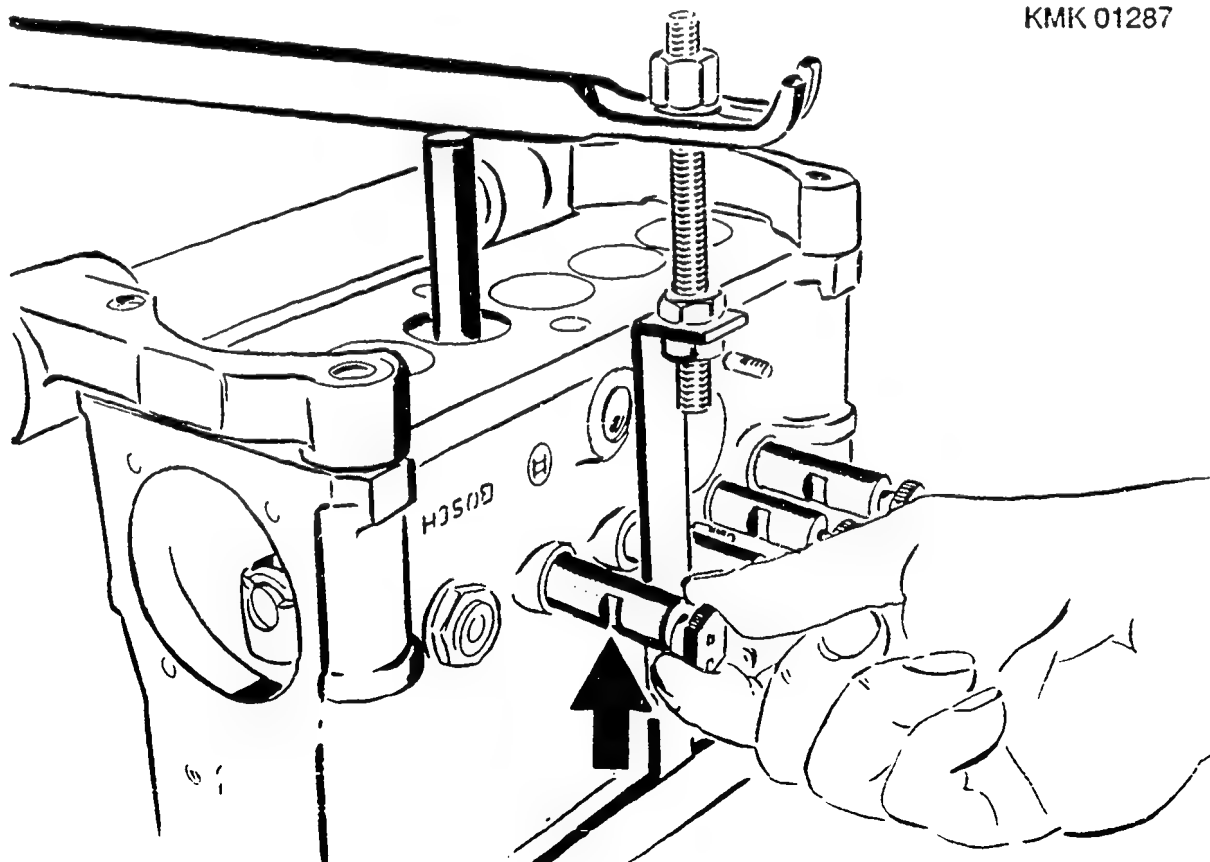
The milled keyways (arrow) on the side of the tappet holder must be perpendicular.

### Note:

If the roller tappet cannot be inserted far enough, the control rod is to be moved with the tubular lever detensioned until the roller tappet can be pressed entirely into its guide hole.

Remove assembly device 0 986 612 072 (KDEP 1556).

Continue: E16/1 Fig.: E15/2

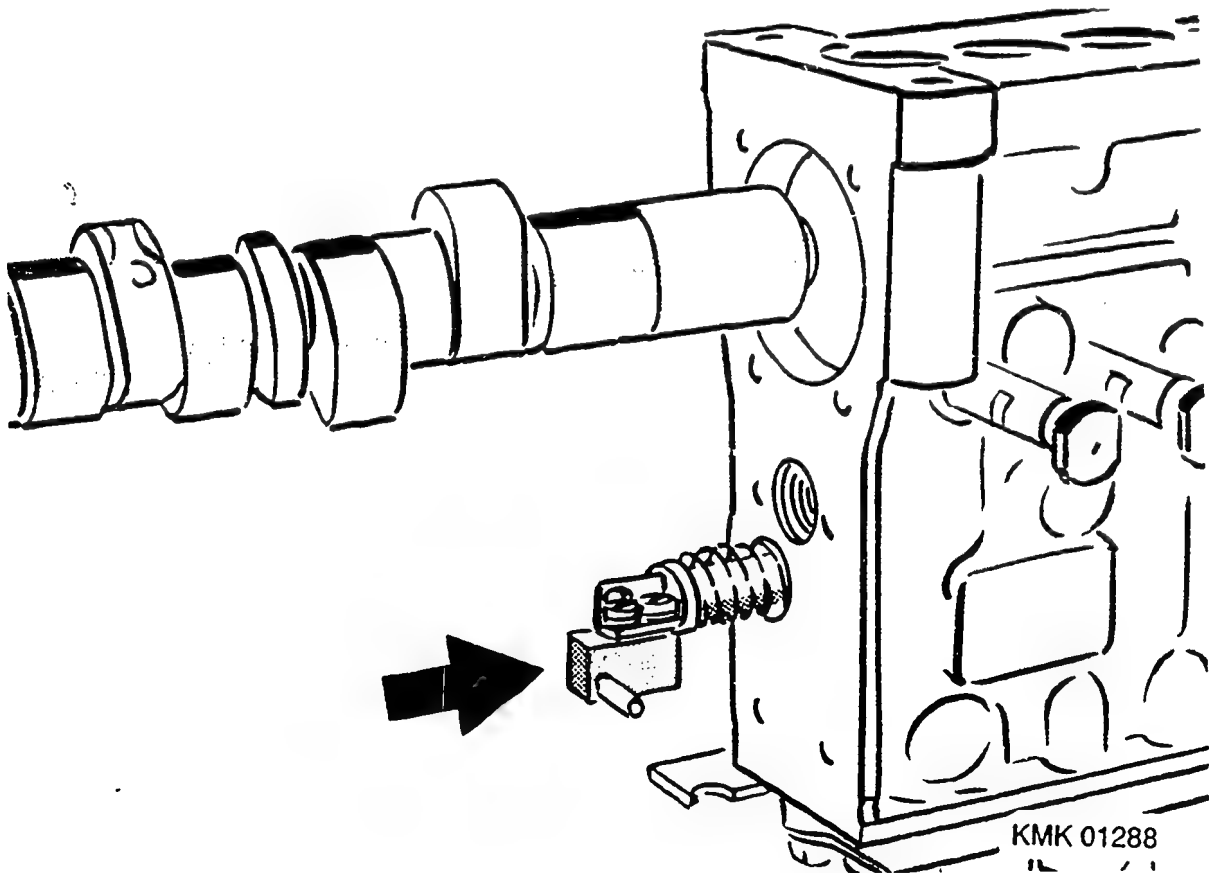


## INSTALLING CAMSHAFT

Insert camshaft with intermediate bearing into pump housing on governor end.

Fit play-compensating spring of control rod and connecting link (arrow)(only with mechanical governor).

Continue: E17/1 Fig.: E16/2



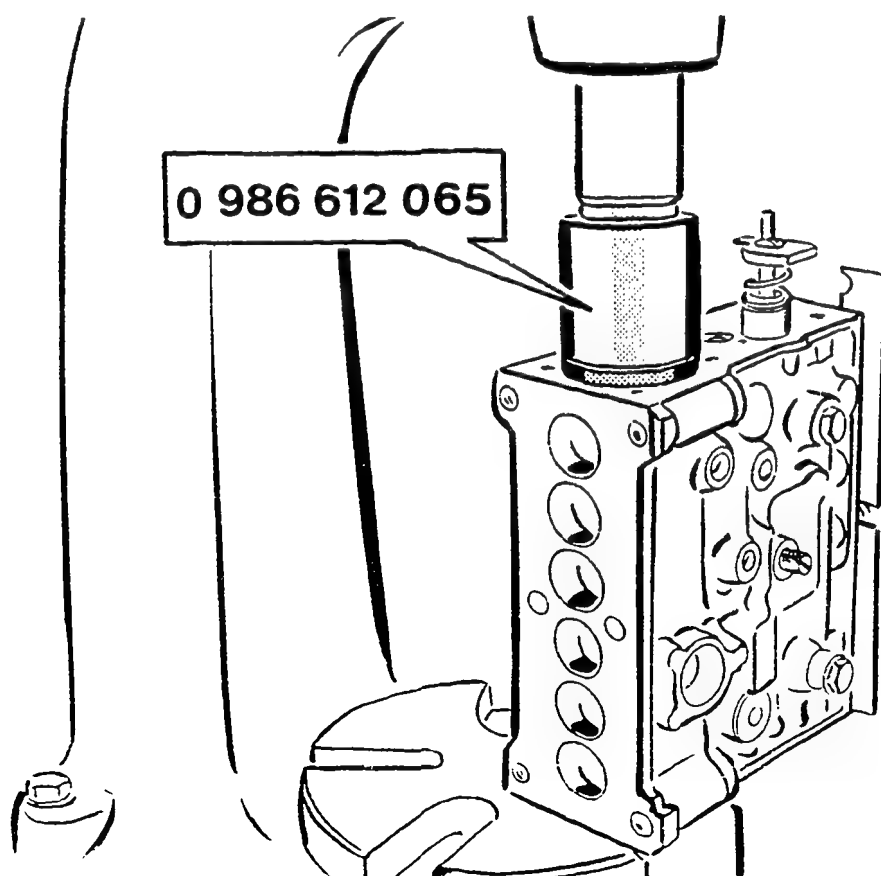
## INSTALLING CAMSHAFT

Screw guide bushing 0 986 912 493 onto camshaft. Slip base body of 0 986 612 065 (KDEP 1552) over guide nut and press outer race of governor-end roller bearing into pump housing under press.

In the case of pumps with end flange and mounting plate fitted, it is advisable to use the support ring 0 986 612 106 (KDEP 1568) to provide the pump with support.

Unscrew guide bushing.

Continue: E18/1 Fig.: E17/2

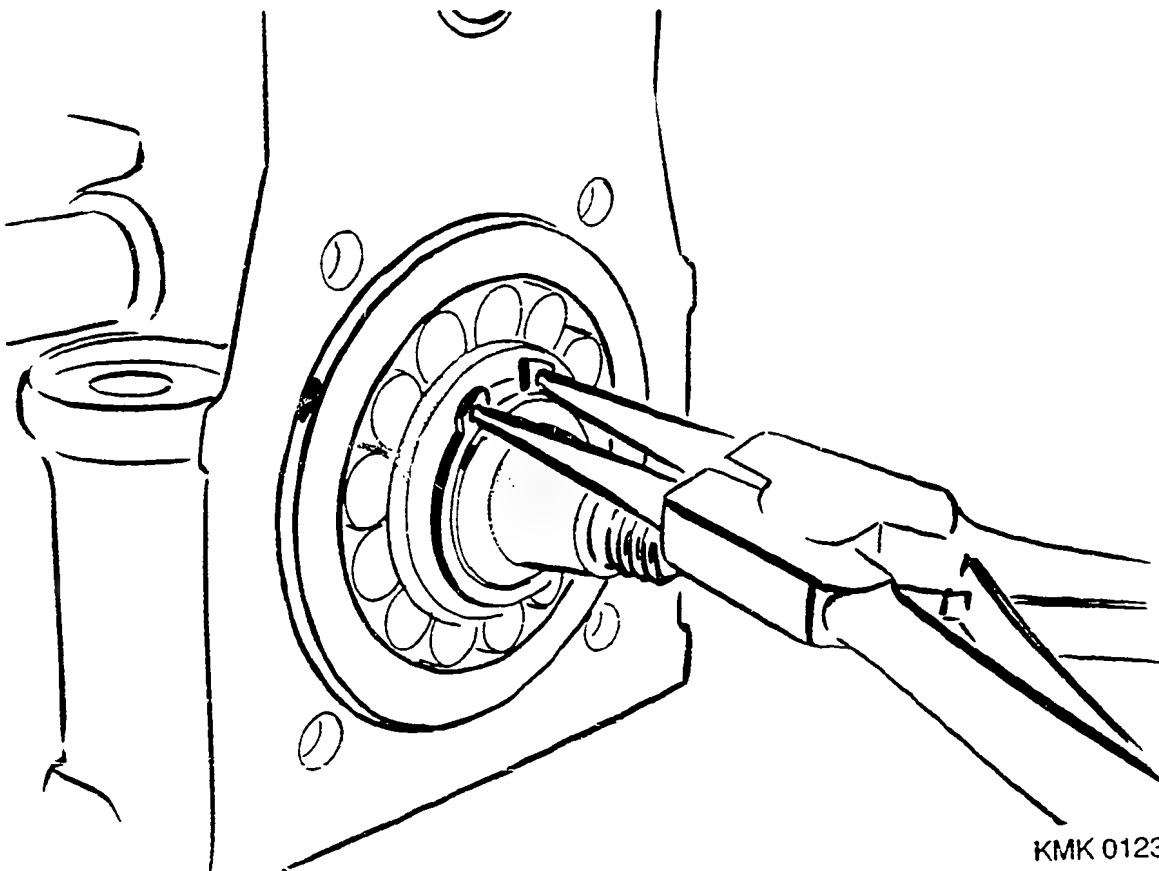


KMK 01289

# INSTALLING CAMSHAFT

Attach shaft retainer to camshaft.

Continue: E19/1 Fig.: E18/2



KMK 01231

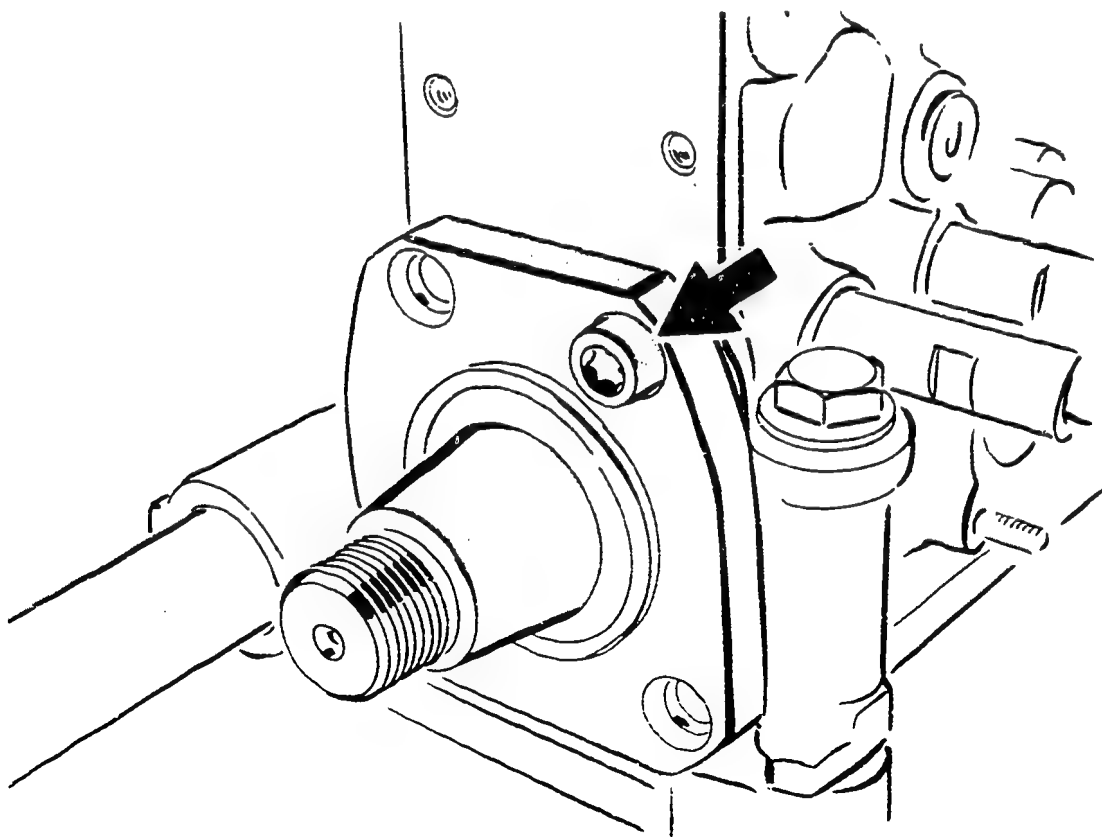
## FITTING BEARING END PLATE

Press drive-end bearing end plate by hand via camshaft into bearing-end-plate hole in pump housing.

In doing so, pay attention to positional overlap of mounting holes with corresponding tapped holes in pump housing.

On assembly, use must be made of the new, micro-encapsulated screws. Screw in all fastening screws of bearing end plate (arrow) and tighten to prescribed tightening torque 18 ... 20 Nm.

Continue: E20/1 Fig.: E19/2



KMK 01232



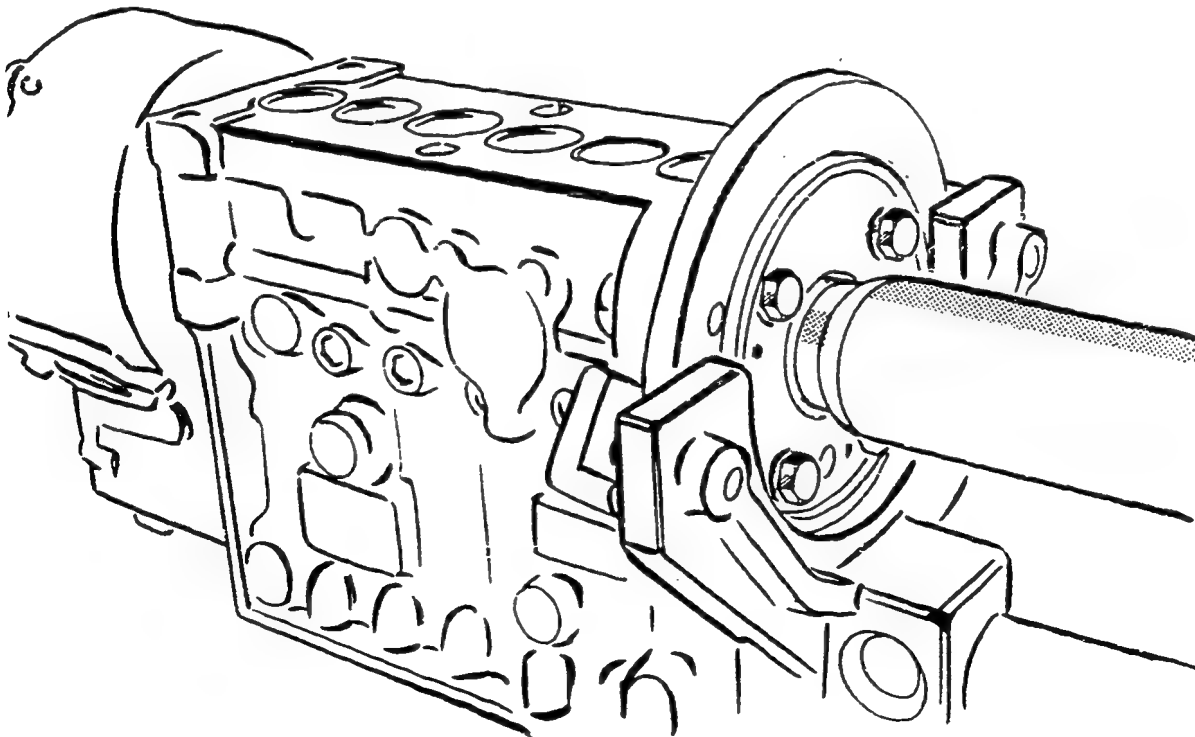
## INSTALLING CAMSHAFT

Without using grease, slip drive-end radial-lip-type oil seal over assembly sleeve 0 986 612 058 (KDEP 1548) or 0 986 612 060 (KDEP 1549) and camshaft.

Depending on taper diameter of camshaft use pressing-on tool 0 986 612 084 (KDEP 1558) or 0 986 612 085 (KDEP 1559) to press radial-lip-type oil seal into appropriate recess in bearing end plate.

Coat outer ring of radial-lip-type oil seal with tallow to facilitate installation.

Continue: E21/1 Fig.: E20/2



KMK 01291

## INSTALLING CAMSHAFT

Screw new fastening screws (1) with resilient sleeves (2) into intermediate bearing (picture a).

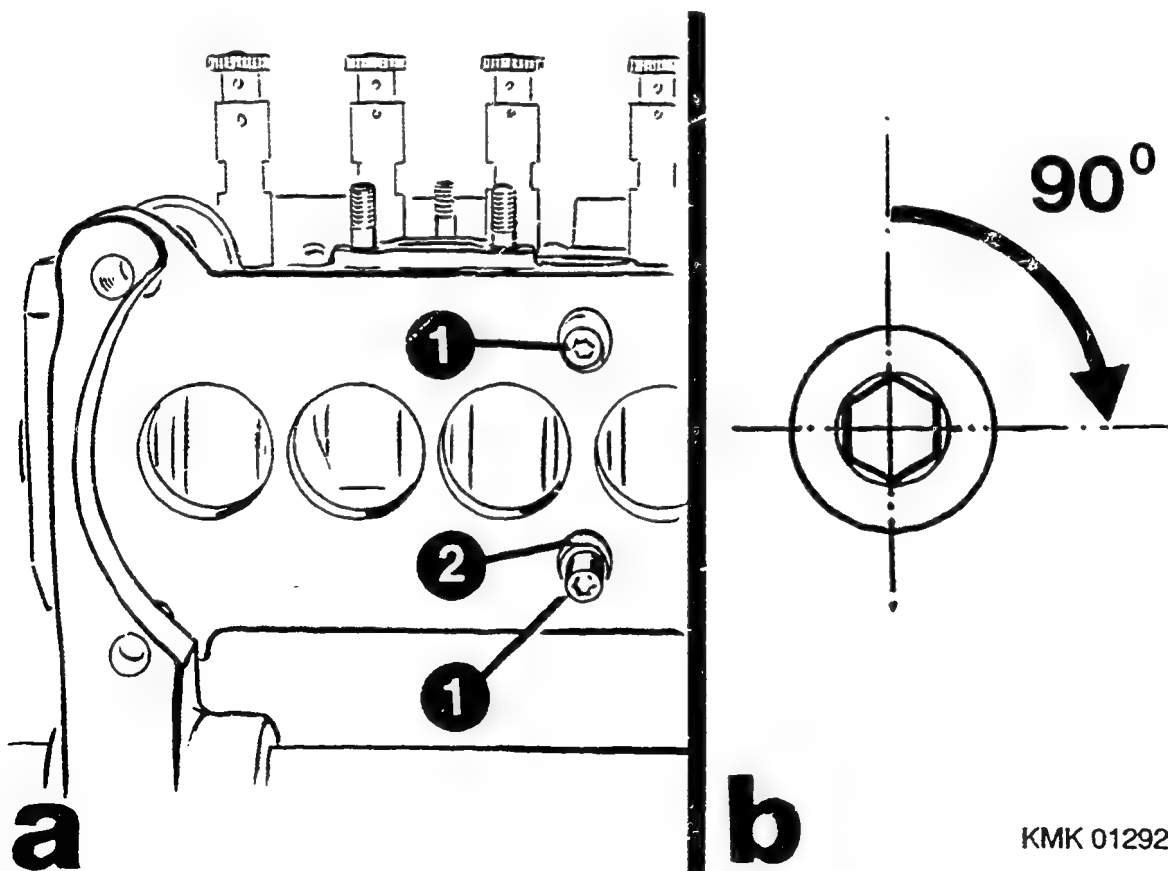
Tighten screws to pre-tightening torque of 7 ... 9 Nm.

Then turn screws by a further 90 degrees and secure (picture b).

### Note:

The tightening specification in line with the angle tightening method must be adhered to, in order to guarantee screw tightness and freedom from leaks.

Continue: E22/1 Fig.: E21/2



KMK 01292

## INSTALLING CAMSHAFT

Residual micro-encapsulation must be removed from tapped holes in pump housing using M6 tap. Then clean holes.

Insert seal into governor housing.

Screw governor housing onto pump housing.

### Note:

On assembly, use must be made of new, micro-encapsulated screws.

Continue: E23/1

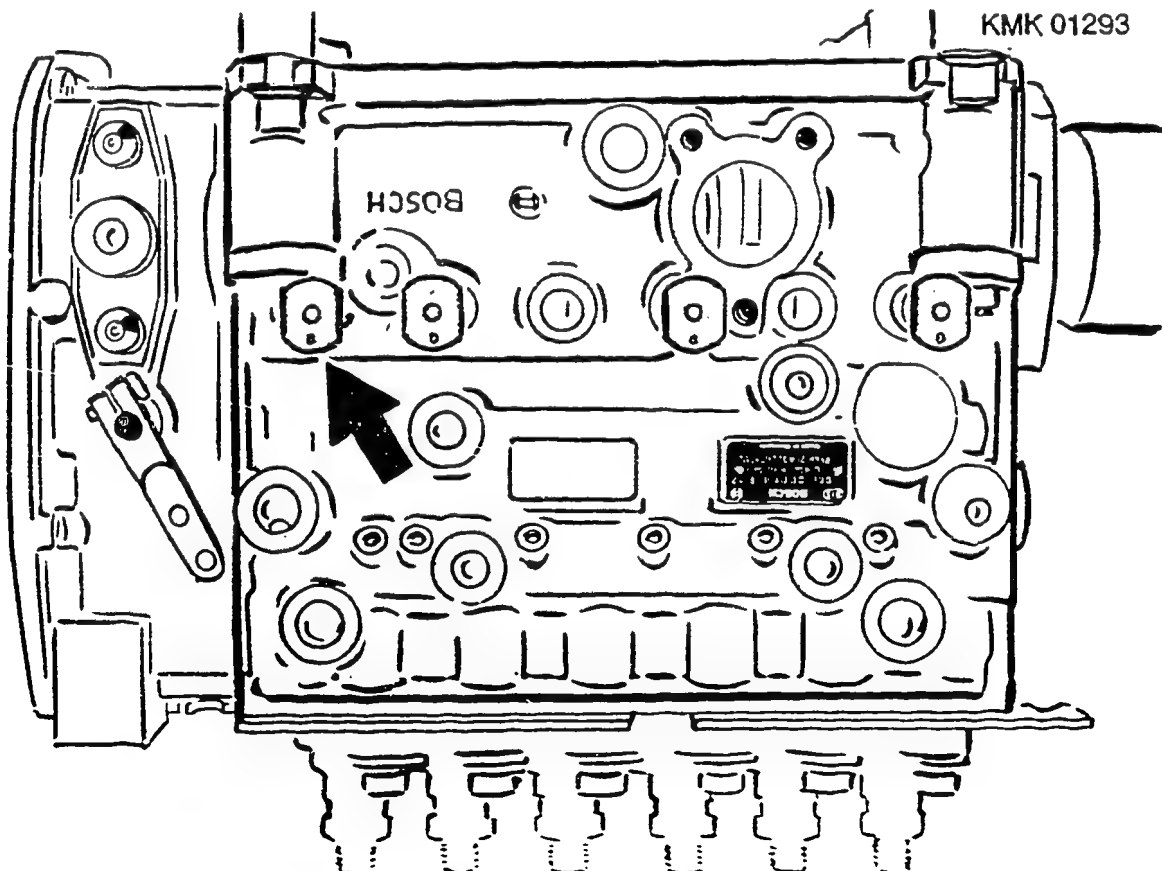
## INSTALLING CAMSHAFT

Attach drive coupling to taper of camshaft on drive end.

Rotate camshaft with wrench 0 986 612 071 (KDEP 1555) and gradually turn eccentric pins of tappet holders 0 986 612 482 through 180 Grad to lower roller tappets onto cams of camshaft.

Remove tappet holders (picture).

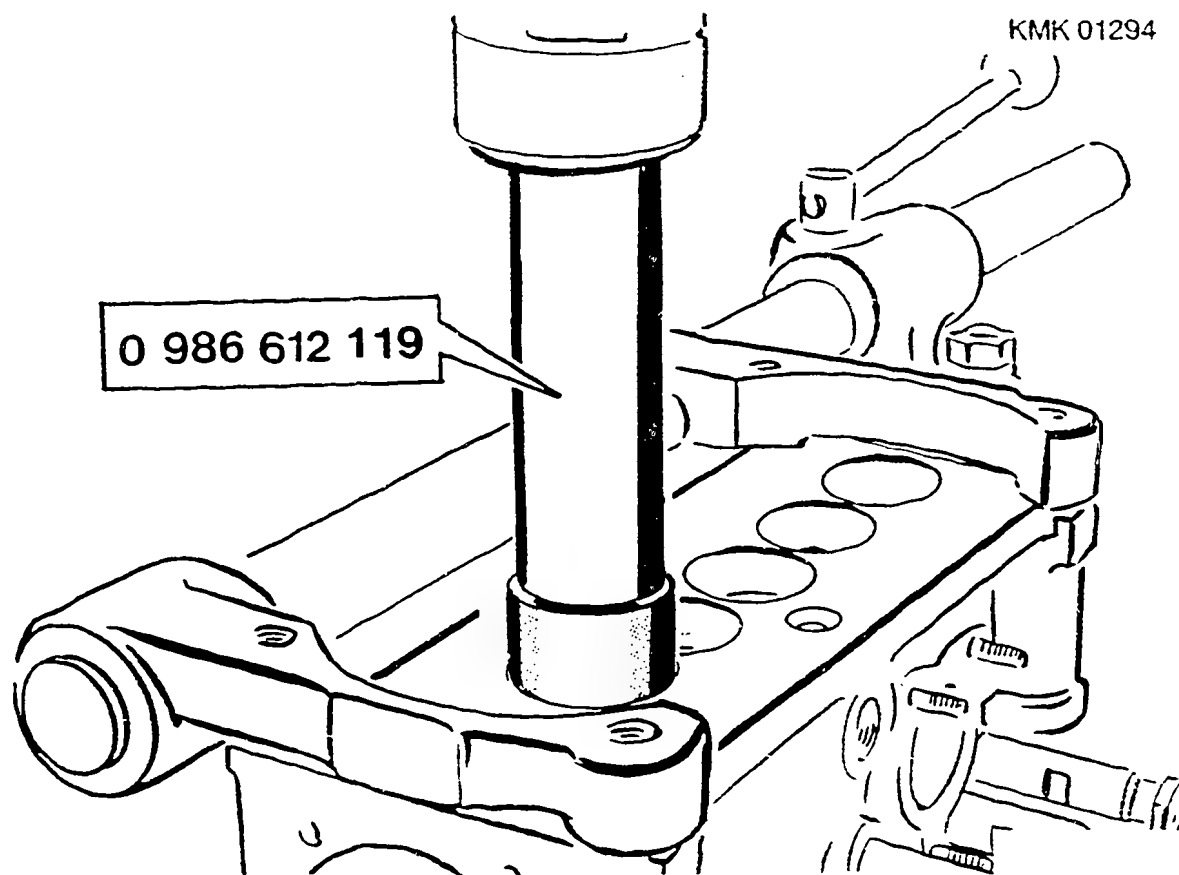
Continue: E24/1 Fig.: E23/2



## INSTALLING CAMSHAFT

Use pressing-in mandrel 0 986 612 119 (KDEP 1574) to knock bottom end covers into assembly holes on bottom of housing.

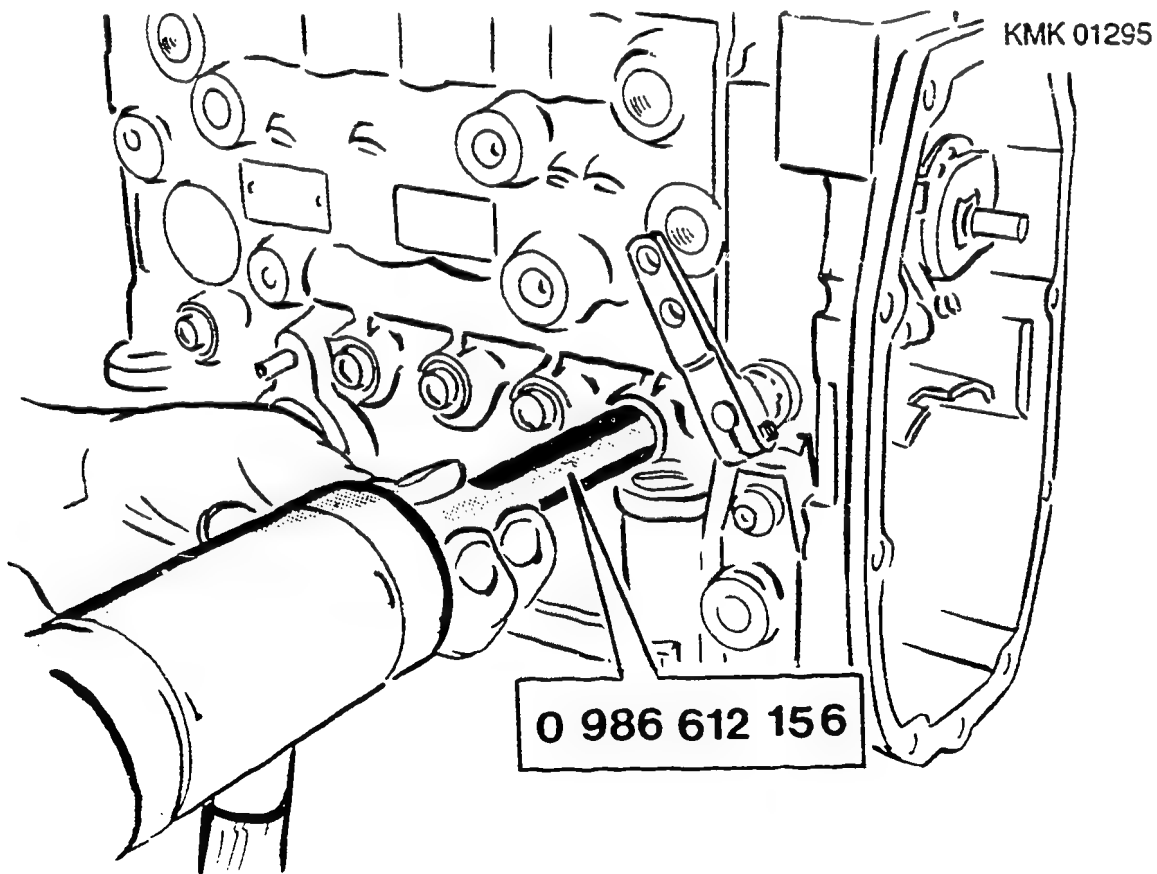
Continue: E25/1 Fig.: E24/2



## INSTALLING CAMSHAFT

Seal mounting holes for tappet holders with new metal covers using pressing-in mandrel 0 986 612 156 (KDEP 1598).

Continue: E26/1 Fig.: E25/2



## INSTALLING PRESTROKE SHIMS

Loosen fastening nuts of barrel-and-flange elements.

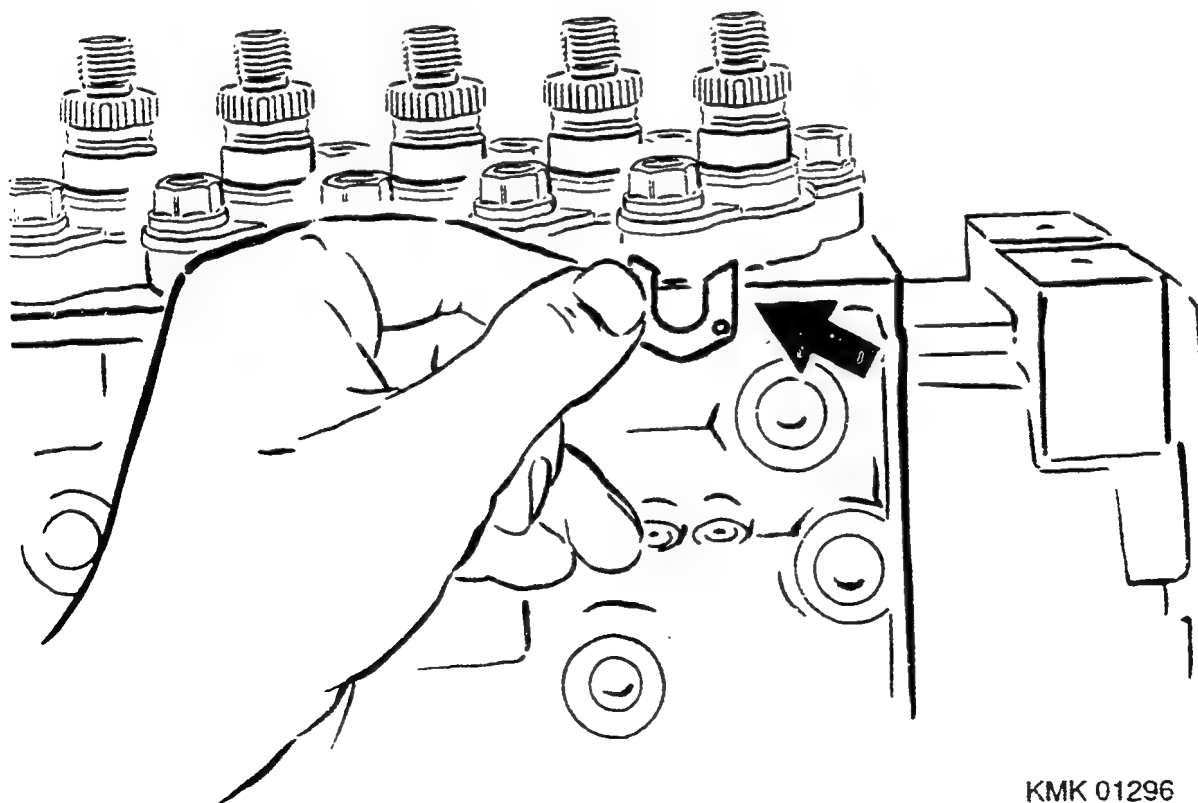
Remove spacers 0 986 612 061 (KDEP 1550).

Insert prestroke shims beneath assembly flanges in same configuration as they were prior to pump disassembly (arrow).

Tighten fastening nuts to 40 ... 45 Nm .

Check freedom of movement of control rod.

Continue: E27/1 Fig.: E26/2



KMK 01296

GOVERNOR ATTACHMENT

Fit governor in accordance with  
respective repair instructions.

Continue: E28/1



## LEAK TEST ON CAMSHAFT, SPRING AND GOVERNOR INTERIOR

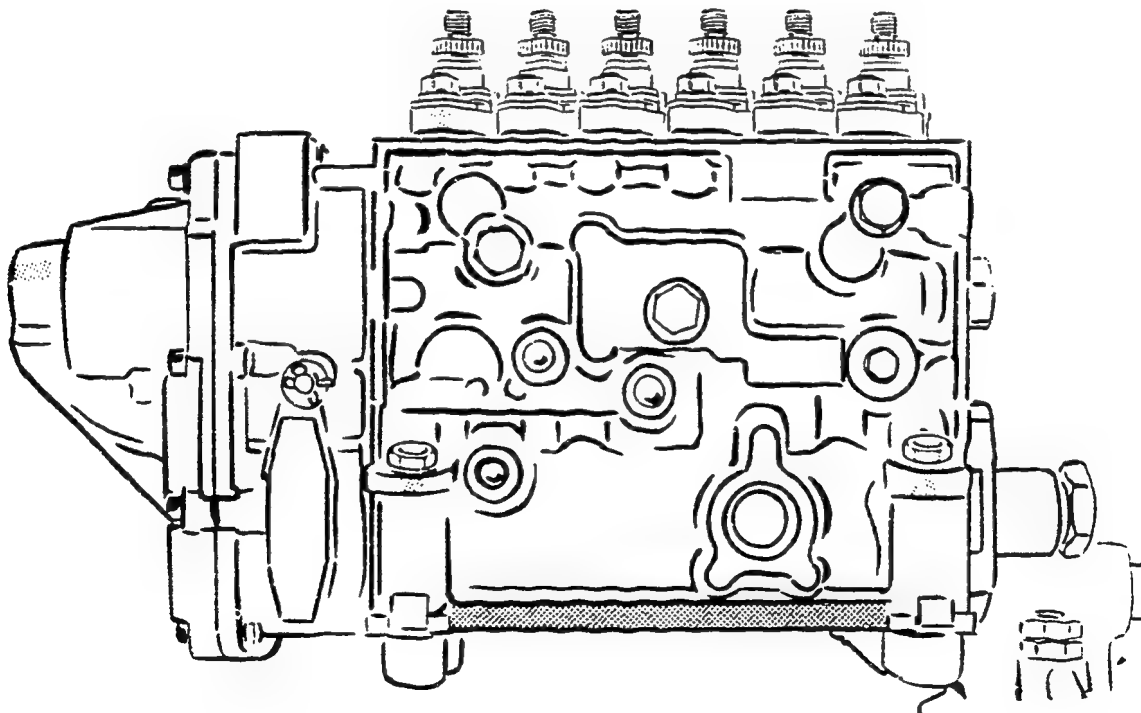
Completely assemble pump (picture).

Supply the compressed air required for the leak test to the camshaft chamber at a suitable location (e.g. oil check hole).

Immerse pump perpendicularly into test bath.

The delivery-valve holders must not be flooded with calibrating oil.

Continue: F01/1 Fig.: E28/2



KMK 01215

LEAK TEST ON CAMSHAFT, SPRING AND  
GOVERNOR INTERIOR

Note:

To avoid the possibility of skin irritation, apply protective cream to hands before starting test and wash hands in soap and water upon completion of testing. Wear rubber gloves if possible.

Continue: F01/2

LEAK TEST ON CAMSHAFT, SPRING AND  
GOVERNOR INTERIOR

\* 7 minutes at 1.5 bar, then  
1 minute at 0.5 bar.

Perform visual inspection to establish whether all sealing surfaces, unions, sealing rings and end covers on housing and cover are leakproof.

There must be no visible air bubbles.

Set fuel-injection pump on pump test bench.

Continue: A01/1

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